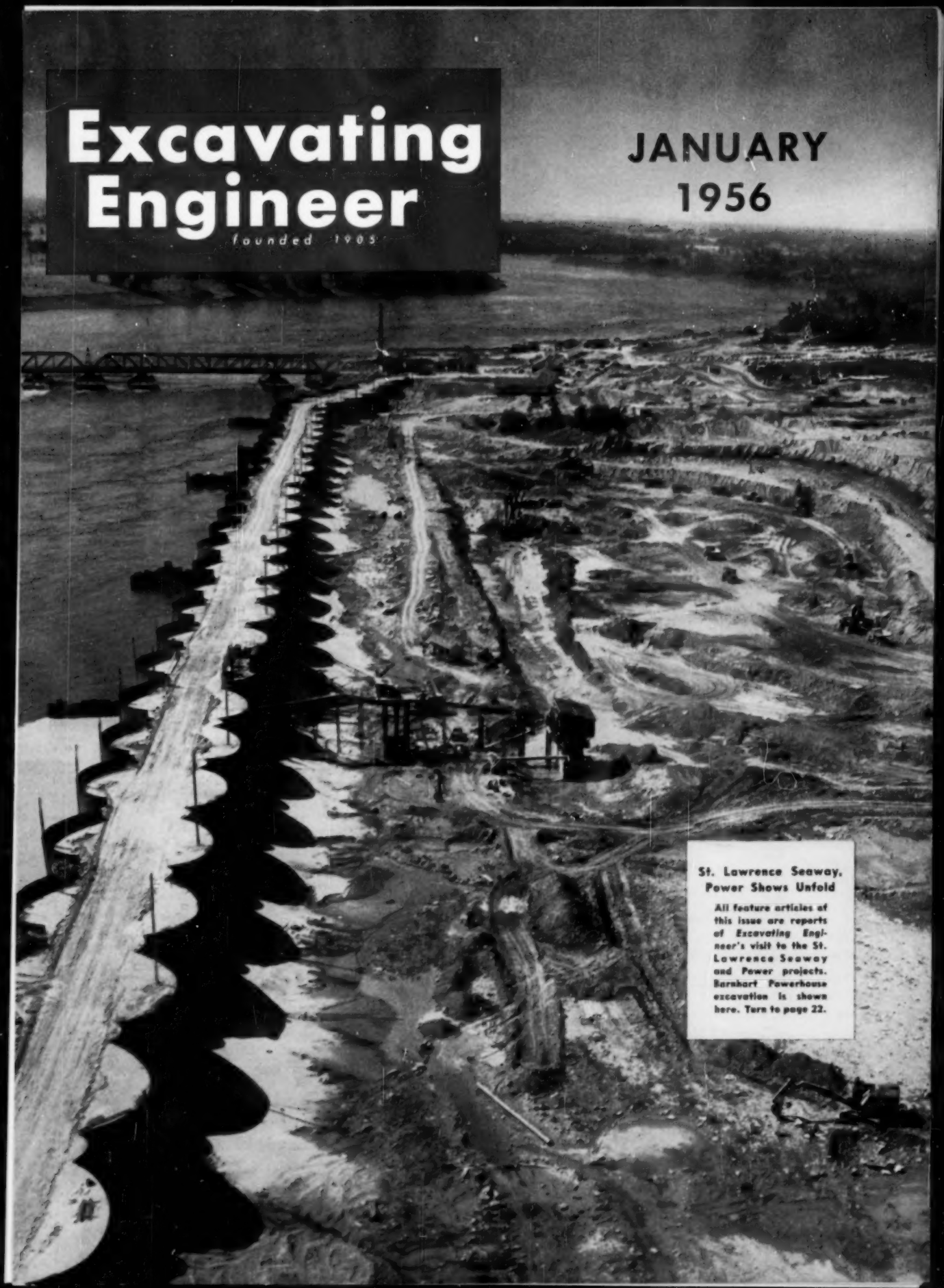
Excavating Engineer

founded 1905

JANUARY
1956

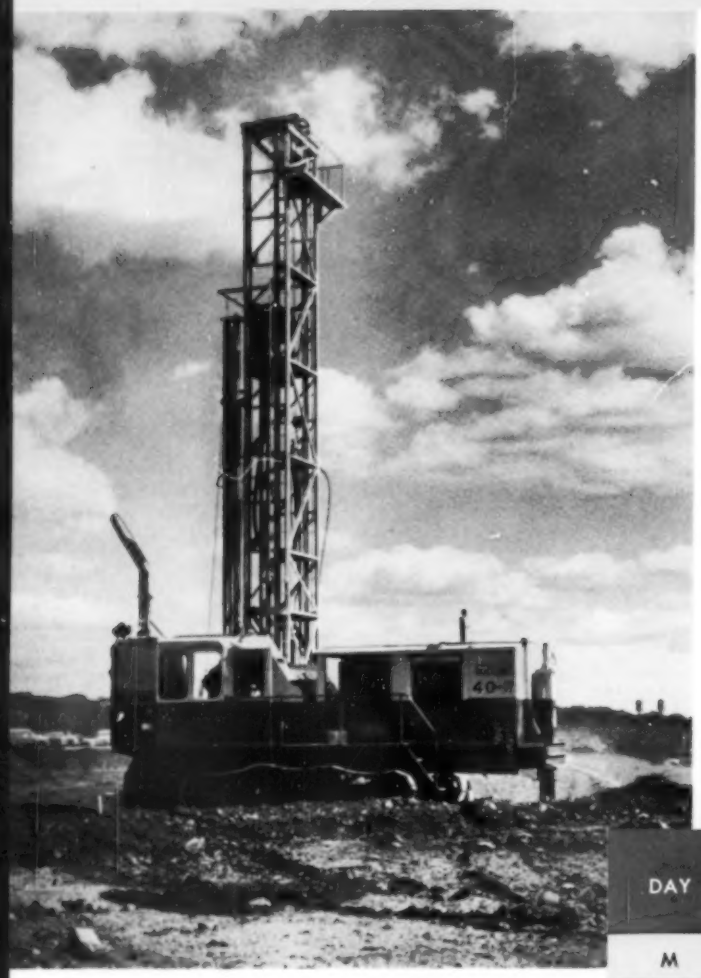


St. Lawrence Seaway, Power Shows Unfold

All feature articles of this issue are reports of *Excavating Engineer's* visit to the St. Lawrence Seaway and Power projects. Barnhart Powerhouse excavation is shown here. Turn to page 22.

LARGE-DIAMETER ROTARY DRILL

Speeds Rock Preparation on Seaway



McNamara-Pigott-Peacock, Ltd., Toronto, Ont., first contractors on the St. Lawrence seaway, chose this Bucyrus-Erie 40-R rotary blast hole drill for rock removal operations in the Lachine rapids section of the seaway. Their contract covers construction of a section of the main ship canal between the Victoria and the Jacques Cartier bridges on the St. Lawrence, directly opposite Montreal's harbor. The estimated volume of excavation required for this section of the canal, which is 225 feet wide, 36 feet deep, and 7,600 feet long, is about 3,400,000 cu. yd.

Material drilled consists for the most part of black shale intruded by bands of very hard igneous rock. Holes are 6¾ in. diameter spaced in a 15 ft. by 18 ft. pattern. Here's the 40-R's output during a recent five-day working period.

31B55C

DAY	NO. HOURS WORKED	NO. HOURS DRILLING	FEET DRILLED	FEET/ HOUR DRILLING	FEET/ SHIFT HR.
M	11¼	9½	546	57.5	48.5
Tu	10½	7⅔	312	40.7	29.9
W	11	9¼	468	50.7	42.5
Th	11½	10¼	273	26.6	23.7
F	10½	7 11/12	741	93.0	70.5

Because of its massive power and high rate of progress, the 40-R rotary offers unexcelled efficiency for large-scale drilling operations. Down pressure on the bit is hydraulically powered for maximum controlled penetration. Ward Leonard electric control on rotation of drill pipe permits drilling at most efficient speed for a given formation. The 40-R's drilling speed not only cuts drilling costs, but also permits it to keep well ahead of the excavation for maximum use of digging and loading units.

Let us tell you more about the speed and economy of Bucyrus-Erie rotary blast hole drills. Write today for detailed, illustrated literature. Model 40-R drills 6¾ to 9 in. holes, and is available with either diesel-electric or full electric power.

BUCYRUS ERIE
South Milwaukee Wisconsin

75 YEARS OF SERVICE to Men Who Shape the Earth

How high load capacity is built into less space in Dodge-TIMKEN All-Steel pillow block

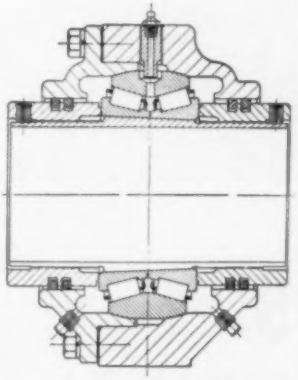
THIS rugged Dodge-Timken pillow block packs more capacity in less space than ever before. All-steel construction gives it extra strength and durability. The design is compact. No special thrust devices that take up extra space are needed—the two-row Timken® tapered roller bearing takes *both* radial and thrust loads in any combination. And full line contact between the rollers and races assures high load capacity.

The cutaway view below shows the bearing. It is of special design, with tapered bore and self-aligning spherical outer surface—never requires adjustment. As in all Timken bearings, races and rollers are case-carburized and have tough, shock-resistant cores under hard, wear-resistant surfaces. Under normal conditions, the Timken bearing will last the life of the machinery with which the pillow block is used.

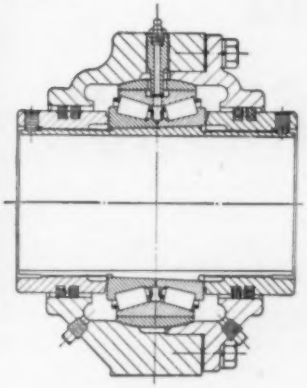
In addition to the all-steel pillow block shown here, Timken bearings are also used in the Type "E", Double-Interlock, Type "C", and Special-Duty pillow blocks—other versatile pillow blocks in the Dodge-Timken line with a wide variety of uses in industry.

To be sure of the finest bearing steel, we make our own—America's only bearing manufacturer that does. No other bearings can give you all the advantages you get with Timken bearings. Include them in your design plans... specify them for the machines you buy or build. Look for the trademark "Timken"—it's on the bearing that makes any machine run better. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **DODGE MANUFACTURING CORPORATION,** Mishawaka, Ind., mounts Timken bearings in the Dodge-Timken All-Steel pillow block. Above: non-expansion block with fixed bearing. Below: expansion block with floating bearing.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST —▯— LOADS OR ANY COMBINATION

D9 MOVES BIG YARDAGE

for MORRISON-KNUDSEN

A CAT* D9 Tractor with No. 9S Bulldozer is the prime earthmoving tool on this Morrison-Knudsen contract in Idaho. The job—relocating 11.37 miles of the Idaho City-Owl Creek road—involves clearing 64 acres and moving 337,000 cubic yards of dirt and rock. One rock cut is 87 feet deep and there are fills up to 30 feet.

With its huge 14-foot 'dozer, capable of handling up to 9 cu. yd. at a blade load, the D9 makes 40 passes, 200 feet long, per hour.

Now that the D9 has proved itself on jobs all over the country, owners recognize it as the top production machine among big tractors. It's the first track-type tractor with Turbocharger. The 286 HP Caterpillar Diesel Engine gives it ample power to match its weight and traction. You have a choice of torque converter or oil clutch drive. And there is "Live-shaft" drive for rear-mounted equipment.

Operators say this big machine is "as easy to handle as a small tractor." Easy to service, too. The exclusive, trouble-free oil clutch, separately removable power train components and a fuel system that needs no adjustments in the field are among the reasons why.

Your Caterpillar Dealer can give you some eye-opening facts about the economy of the D9 for big yardage jobs. Ask him for a working demonstration today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Excavating Engineer

founded 1905

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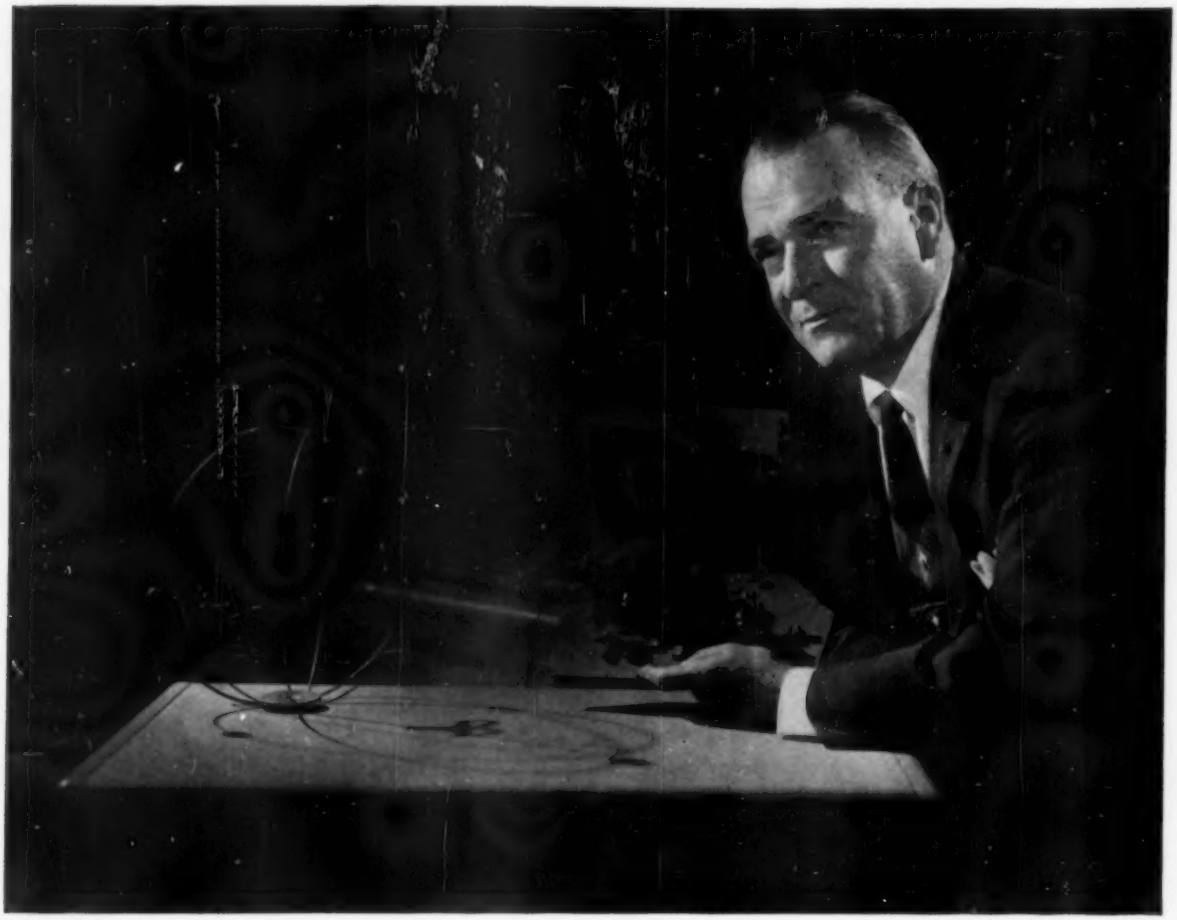

JOHN S. COLEMAN

Portrait by Fabian Bachrach

"I am proud that 80% of Burroughs Employees..."

"I am proud that 80% of Burroughs employees are enrolled in systematic savings in U. S. Savings Bonds through the Payroll Savings Plan. The record of the response of our men and women to our recent campaign speaks for itself. It is evidence of the desire to save, and to save in a way which benefits both the individual and the nation. I hope that every employer will take advantage of this opportunity to serve the interest of both his employees and the country by cooperating with the Department of the Treasury in the U. S. Savings Bonds campaign."

JOHN S. COLEMAN, *President*
Burroughs Corporation

What is the percentage of employee participation in *your* Payroll Savings Plan?* If it is less than 50%, your State Sales Director will be glad to show you how easy it is to raise participation to 60% or higher. He will furnish Payroll Savings Application Blanks, and all the printed promotional material you can use. Write today to Savings Bonds Division, U. S. Treasury Department, Washington 25, D. C.

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EXCAVATING ENGINEER

NORTHWESTS LEAD THE WAY on another TURNPIKE!

Already 16 NORTHWESTS HAVE STARTED THE TOUGH WORK ON THE KANSAS TURNPIKE!

In the tough rock cuts on the Kansas Turnpike—that's where you find those big Northwest 80-D's—16 of them—doing the real hard work on the Kansas Turnpike right-of-way!

And this is only part of the list of many Northwests (more than any other make) on the whole Kansas Turnpike job.

Here again, Northwest owners lead the way with a *real* Rock Shovel, the kind of equipment you should have, for remember, if you have a *real* Rock Shovel you never have to worry about output in any digging.

See a Northwest Man.

NORTHWEST ENGINEERING COMPANY
1506 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

HISTORY REPEATS ITSELF

- OVER HALF THE SHOVEL EQUIPMENT ON THE WEST VIRGINIA TURNPIKE WAS NORTHWEST
- WELL OVER 100 NORTHWESTS ON THE NEW YORK THRUWAY—MORE THAN ANY OTHER MAKE
- OVER 60 NORTHWESTS ON THE OHIO TURNPIKE
- OVER 20 NORTHWESTS ON THE MAINE TURNPIKE EXTENSION
- 42 NORTHWESTS ON THE MASSACHUSETTS TURNPIKE—MORE THAN ANY OTHER MAKE

NORTHWEST

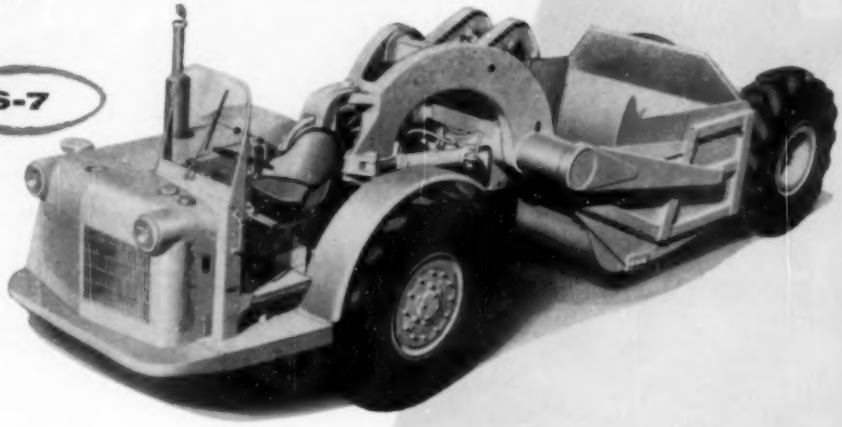
SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

A complete line of 5 "EUC" SCRAPERS...

more WORK-ABILITY... *Better* ACCESSIBILITY

Customer acceptance and preference has made "Euc" Scrapers the fastest selling line in the industry. The simple, practical design of every Euclid scraper model is years ahead of the field in ease of operation and maintenance and in production performance. Like all other Euclid earth moving equipment, "Euc" Scrapers are built to stay on the job longer with less down time for servicing and repair. For example, lever action provides fast, positive and independent control of bowl, apron and ejector without cable or sheave expense. The 4 section cutting blade has long life and assures efficient loading in any material. All major components are readily accessible—a mighty important cost cutting feature—in both the single axle and four wheel tractor models.

S-7



The S-7 has better than 20 h.p. for each yard of payload—a 143 h.p. engine and 7 cu. yds. struck capacity. It's primarily designed for small yardage jobs and for work in close quarters where maneuverability is essential—non-stop turning width is 28 ft.—tires are 18.00 x 25 with 21.00 x 25 optional for work in sand or other tough job conditions.

S-12

For medium size jobs or as a utility machine on large projects, this S-12 is the answer. Payload capacity is 12 yds. struck and 16 yds. at 1:1 slope. Powered by a 218 h.p. engine, this model has a top speed of 28 mph with full payload — makes a non-stop 180° turn in 31 ft. Tires are 26.50 x 25 — width of cut is 9' 6".

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

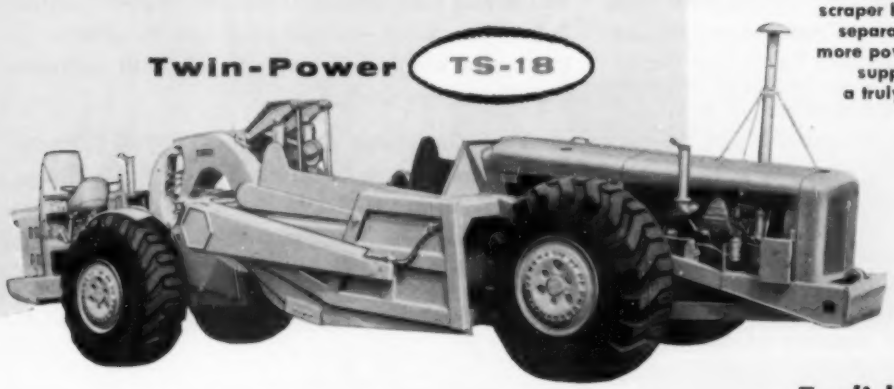
7 to 18 yds. struck payload · 143 to 518 h.p.

for a wide range of work—small jobs to big projects

This 15.5 yd. Scraper has built-in performance that gets more work done. It is powered by a 300 h.p. engine with either a 10-speed transmission or Torqmatic Drive—has a heaped capacity of 21 yds. at 1:1 slope, 18 yds. at 3:1. Cutting width is 10 feet. Drive tires are 24.00 x 25 standard with 29.50 x 25 available as optional equipment. The extra speed and stability of this "Euc" really pays off on long hauls.

With Torqmatic Drive and 300 h.p. engine, the S-18 hauls heaped loads up to 24 yds. at fast travel speeds—struck capacity is 18 yds. Standard tires are 27.00 x 33 with 33.50 x 33 optional for maximum traction and flotation on tough jobs. In spite of its size and capacity, the S-18 makes a non-stop 180° turn in only 36 ft.

Twin-Power TS-18



The TS-18 is the most recent development in the Twin Power principle pioneered by Euclid. It is powered by two 218 h.p. engines—one in the tractor and one behind the scraper bowl. Both engines drive through separate Torqmatic Drives. Where even more power is required the tractor can be supplied with a 300 h.p. engine. It is a truly self-loading machine due to its tremendous power and traction—works on grades and under conditions that stymie other scrapers and is a one-man earthmoving outfit. Standard tires are 27.00 x 33—with 33.50 x 33 available as optional.

For profitable scraper production and performance

Euclids are your best investment

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID

GM GENERAL MOTORS

"I'VE BEEN MOVING DIRT SINCE 1936 AND TRIED ABOUT ALL KINDS OF EQUIPMENT. I'VE FOUND THAT **CAT*** EQUIPMENT ALWAYS COULD GO WHERE OTHER MOTOR GRADERS AND TRACTORS COULDN'T—AND STAYED ON THE JOB DAY AFTER DAY WITH PRACTICALLY NO ATTENTION EXCEPT FOR GREASING."

A. H. HOUSE, Superintendent for M. E. Ruby, Jr., Austin, Texas

Mr. House, like all construction superintendents, rates his machines by *results*. He's getting them from the Caterpillar No. 12 Motor Grader shown helping build a farm-to-market road near La Grange, Texas.

The big yellow unit is maintaining a haul road for the fast-stepping DW15s and Scrapers. Result: the wheeled rigs are hauling 14 yards per trip on a 2½-mile haul in 12 minutes, including loading and dumping!

The No. 12 is wringing the last cent of economy out of the tractor-scraper teams on the job—helping them haul maximum capacity at the highest possible speed. Tomorrow this rig can be leveling, grading, shaping embankment or sloping fill.

And now the No. 12 can do all its many construction chores *even better*. For it is the first motor grader to be equipped with the exclusive Caterpillar oil clutch. Now disc replacement is practically eliminated and maintenance is greatly reduced. Clutch fade, even under extreme operating conditions, is practically eliminated since the oil bath prevents the plates from heating.

Your Caterpillar Dealer would like to demonstrate these new motor graders on *your* job. Seeing them in action you'll understand how these versatile machines now can give you even more work at lower cost.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE

SPECIAL REPORT

On the St. Lawrence Seaway

As of the 15th of October, 1955, 17 Manitowoc Shovels, Draglines and Cranes were taking on the "tough jobs" along the St. Lawrence Seaway Project with many more Manitowocs scheduled to appear soon.

Project contractors have found that Manitowoc simplified design, rugged construction, fast mobility and all-around job versatility pays off in speeded-up work schedules.

Put all of the job-tested Manitowoc advantages to work on your next bid. Contact your Manitowoc distributor for the whole "profit-happy" picture.

MANITOWOC ENGINEERING CORP. MANITOWOC, WIS.

OTHER MANITOWOCS ON THE SEAWAY PROJECT

American Bridge Division, U. S. Steel
6 - Manitowoc Model 3500's

Perini, Kiewit, Walsh, Utah, Morrison-Knudsen Combine
1 - Manitowoc Model 4500

Peter Kiewit & Sons Co.
1 - Manitowoc Model 4500

Kiewit-Johnson & Johnson
2 - Manitowoc Model 3900's
2 - Manitowoc Model 4500's

Morrison-Knudsen Co., Inc.
4 - Manitowoc Model 4500's

Equipped with a 6½-yd. bucket, this 4500 dragline operated by Morrison-Knudsen loads 22 cu. yd. wagons in three passes per unit during preliminary work on diversion, cut "F".

This Manitowoc 5½-yd. Model 4500 shovel is excavating at the site of Barnhart Island powerhouse for the combine of Perini, Kiewit, Walsh, Utah, Morrison-Knudsen.

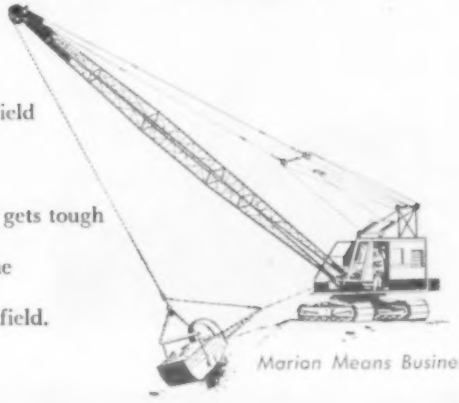
One of six Manitowoc 60-ton 3500 cranes operated by American Bridge — this unit shown placing steel at site of "permanent bridge".

One of the first machines on the St. Lawrence project, this 2½-yd. Manitowoc Model 3500 is shown excavating at the site of Long Sault Dam. The shovel pictured is owned by Drave Corp.

MANITOWOC
SHOVELS 1-5 YD. SpeedCrane CRANES 20-100 TON

champions in their field . . .

Point! Flush! Retrieve! You thrill to the brilliant field work of an experienced Irish Setter. A glance tells you his sure-footed poise and his stamina when the going gets tough are the marks of a true champion. You'll recognize these same qualities in Marion's one-yard 43-M, a champion in its field.



Marion Means Business

MARION POWER SHOVEL COMPANY, MARION, OHIO

THE STRONGEST WIRE MAKES THE STRONGEST ROPE... THAT'S WHY ONLY 1105 IS USED IN

ROEBLING

Royal Blue

WIRE 1105 ROPE

1105 WIRE is the strongest and toughest rope wire that has ever been developed.

Royal Blue is a new all-steel wire rope. It's made of 1105 wire—stands up in service—gives you more for your money because it has more to give.

Ask us for the full facts about Royal Blue Wire Rope, or contact your Roebling distributor.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST. AVE. S. • TULSA, 321 N. CHEYENNE ST.• EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Save travel time

Handle more jobs

If slow-working, slow-moving equipment is keeping you from taking on more jobs, consider the advantage of a versatile Bucyrus-Erie Transit Crane.

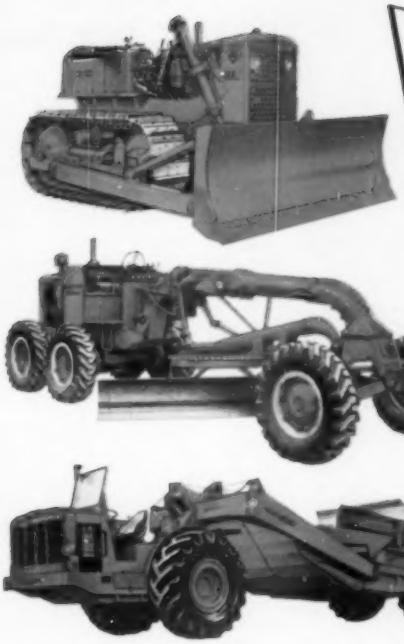
You travel from job to job quickly — at speeds up to 33 mph with the 15-B and 31 mph with the 22-B. Special equipment permits booms over 60-ft. long to be carried folded while traveling. Extendible outriggers add stability while working.

There is plenty of "work-ability" and control along with mobility. Power-controlled lowering contributes to speed and accuracy in setting loads; friction swing brake holds the machine precisely in position. With standard independent boom hoist, boom angle can be changed while swinging, hoisting, or lowering. For jobs where extra precise control is required, 16-part boom suspension (optional equipment) can be supplied instead of the standard 8-part suspension. Pendant-type suspension makes it easy to change boom lengths.

Both the Bucyrus-Erie 15-ton 15-B and 25-ton 22-B Transit Cranes are fully and quickly convertible to shovel, clamshell, dragline and dragshovel. Let your nearby distributor give you all the details and learn how a Transit Crane can help you make more profits by working on more jobs. 179E55C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN



ALLIS-CHALMERS CONSTRUCTION MACHINERY

SOLD but not forgotten

by your Allis-Chalmers dealer

When you invest in Allis-Chalmers construction equipment, you are getting far more than just a modern machine. Your dealer offers you the opportunity to do a better job at lower cost. He wants your equipment to give A-1 performance day in and day out. His reputation depends on it.

That's why your Allis-Chalmers dealer puts so much importance on good preventive maintenance practices . . . encourages you to take full advantage of his modern servicing facilities.

You're always sure of

TRUE ORIGINAL PARTS

from your Allis-Chalmers dealer

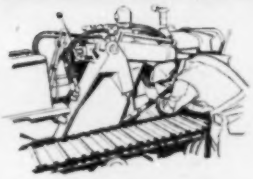
Parts made in the same factory, to the same rigid specifications as original equipment, are your assurance of getting top performance and long life. Treated, packaged and sealed against rust and dust, True Original Parts are stocked in quantity by each dealer to give you quick service close to your job.

And you can have confidence in his

FACTORY-TRAINED MECHANICS, FACTORY-APPROVED METHODS

IN THE SHOP

Specialized facilities include factory-approved tools and all necessary equipment for complete service. Factory-approved methods are used to save you time and money, assure finest workmanship.



IN THE FIELD

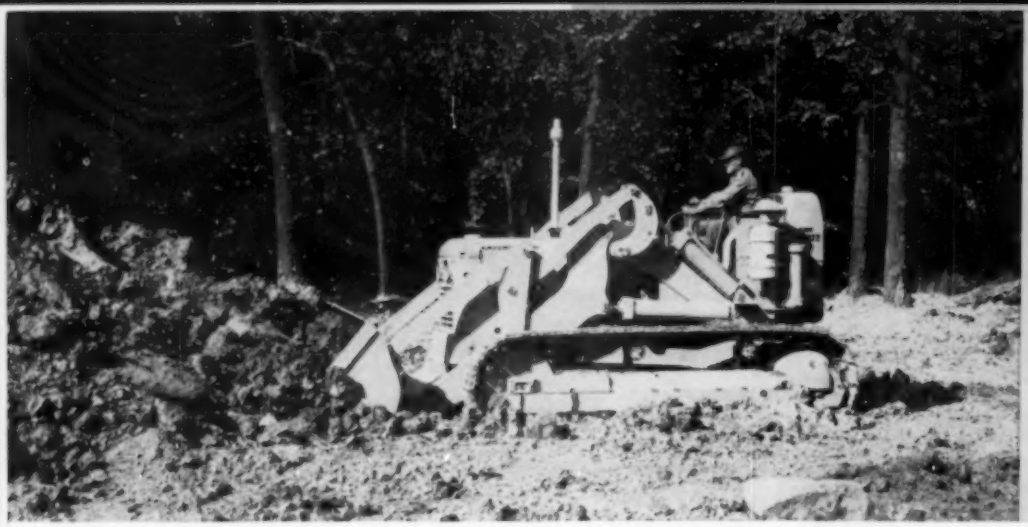
Factory-trained servicemen are ready to help you, day or night. Their technical know-how and practical experience get the job finished fast . . . at lowest possible cost to you.

You can depend on your Allis-Chalmers dealer

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

SOUTH MILWAUKEE, WISCONSIN



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Ample power and traction to "bury" the bucket.

CATERPILLAR ANNOUNCES

THE NEW NO. 977

Here's the new boss of the excavator-loaders...the new Caterpillar No. 977 Traxcavator. The No. 977 has important new features which greatly increase productivity and earning power.

FEATURES OF THE NO. 977 TRAXCAVATOR

- 96-in., 2¼-cu.-yd. bucket.
- 100 HP CAT® Engine, with ample power to "bury" the bucket and lift big loads.
- Newly-designed bucket tips back 40° at ground level to retain heaping loads.
- More than 11½ ft. of dumping height make it easy to load any truck or railroad car.
- Steel bumpers on lift arms allow rapid jarring of bucket, and 50° discharge angle helps to empty sticky materials fast.
- Automatic kick-outs put bucket in "hold" position at maximum height and position bucket for digging on next pass. Easier operation and faster cycle times.
- Advanced hydraulic system, with pump protected by full flow filter.
- Hardened, spool-type operating valves located in large tank, protected from dirt or damage.
- Long-lived, trouble-free oil clutch.
- Fast, one-hand bucket operation. High seat for comfort and visibility.
- Five forward speeds to 7.4 MPH; four reverse speeds to 7 MPH.
- Each track controlled by heavy-duty dry multiple disc steering clutch and contracting band brake.
- Tools for any job: 3-yd. bucket for light material; 9-tooth quarry bucket; heavy-duty bucket; skeleton rock bucket; log and lumber fork.

3

High lift, with over 11½ ft. of dumping height.

2

40° tip back at ground level to hold load.

TRAXCAVATOR*

MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

Please send full information about the new No. 977 Traxcavator.

*Name*_____

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Now three sizes of Traxcavators are available for all your excavating and material-handling needs. They're *unit-built* machines, so efficient that you'll find they match or excel competitive equipment with nominally greater bucket sizes. You can choose the right Traxcavator for your job from the No. 933 (1 cu. yd.)—the No. 955 (1½ cu. yd.)—or the No. 977 (2¼ cu. yd.).

Let your Caterpillar Dealer show you how these new machines can make money and *save* money for you. Get complete information from him. Or mail the coupon.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

4

Fast, sure dumping of sticky materials.

Wire Rope at Work — This is the skeleton of The Parkade, located on the Plaza, Camden, N. J. When finished, The Parkade will be an air-conditioned building with the wings of each floor reserved for offices. The center portion of all floors and the entire roof will be devoted to parking facilities, thus helping to alleviate a problem that has become acute in this part of the city. The Parkade is owned by the Nedmac Corporation; Terminal Construction Corporation is the builder.

The work of construction called for erecting 3500 tons of fabricated steel on a very tight schedule. One 60-ton and three 50-ton cranes were employed, each equipped with a 100-ft boom and Bethlehem wire rope. On any job of this nature Bethlehem rope is a tireless servant, willing and able. It proved so here. Bethlehem Purple Strand was used on all the lifts, and the hefty structural members were swung into place like matchsticks.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

CONSTRUCTION • MINING • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

NEWEST PAYLOADER® MODEL sets the pace for a bomber base

Here is the starting point of Peter Kiewit Sons "production line" for concrete placing at a large bomber base — a Hough model HH "PAYLOADER" tractor-shovel feeding a belt conveyor with sand and gravel from adjoining stockpiles. The task of the "PAYLOADER" is a crucial one, because failure at this point would bring the entire concrete-placing operation to a standstill.

Peter Kiewit Sons, one of the largest and most progressive of heavy contractors, have been using "PAYLOADER" tractor-shovels for years on their contracts all over the United States. You too, can depend on the proven performance of "PAYLOADER" tractor-shovels and on the large and reliable Distributor organization that sells and services them, both at home and abroad.

This model HH is one of three completely-new 4-wheel-drive "PAYLOADER" tractor-shovels. They all have a sensational new kind of bucket arm design that provides 40 degrees of bucket tip-back at ground level, powerful pry-out action plus unusual safety, stability and visibility factors.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
704 Sunnyside Ave., Libertyville, Ill.

Send data on new 4-wheel drive units

- ☐ Model HU—1 cu. yd.
- ☐ Model HH—1½ cu. yd.
- ☐ Model HO—2 cu. yd.
- ☐ Smaller "PAYLOADER" units

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Run one end of the Quarrycord out to a place where it can be lighted easily. When everything is in readiness, light the Quarrycord with a match and *walk away.*

Quarrycord

(PLEASE GIVE THIS ADVERTISEMENT TO YOUR BLASTING FOREMAN)

for one-shot lighting of safety fuse in secondary blasting

Now you can ignite each and every safety fuse from *one point*, and eliminate the hazard of men climbing over the rock pile, lighting each fuse individually.

Now you can have the advantage of fuse blasting, so that the holes go "pop-pop-pop" rather than "BOOM" — to reduce the noise of a single blast.

Now you can fire when convenient, without fear of stray electrical currents causing premature blasts.

Quarrycord is a flexible, water-resistant cord which burns with an external flame at the rate of about one foot per second.

It is very easy to use: (1) Prepare each primer cartridge in the usual way with safety fuse and detonating cap. (2) On the end of the fuse opposite the cap place a Quarrycord Connector. (3) Load and tamp the holes. (4) When ready to blast, run a line of Quarrycord so as to connect with each hole (5) At each fuse, pass the Quarrycord into the slot in the end of the connector and press the "lid" down *tight* over it to make positive contact. (6) If your hook-up has parallel lines of Quarrycord, make frequent cross connections as shown.

Quarrycord is packed on spools in 500 foot lengths, two spools to a box. Connectors are supplied in cardboard boxes containing 100 each.

For more information
see your Explosives Supplier, or write to

THE ENSIGN-BICKFORD COMPANY
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Manufacturers of Primacord® Detonating Fuse, Safety Fuse, Ignitacord®, Blasting Accessories.

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Free Folder tells the whole story: what it does, and how to use it. Every Blaster should have a copy — send for it today.

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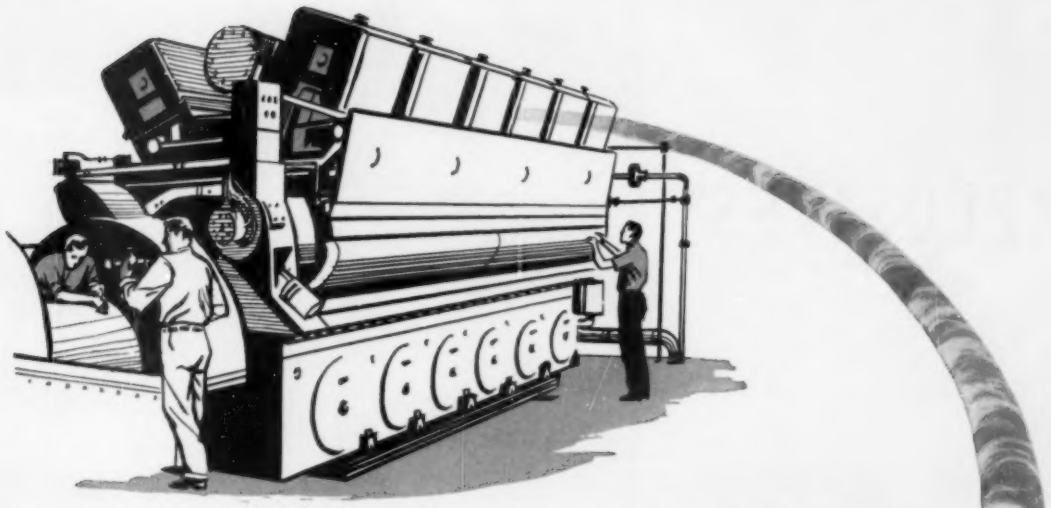
Quarrycord

for lighting Safety Fuse in Secondary Blasting

Q-4



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with less fuel...less noise...less smoke

AiResearch Turbochargers give your stationary or mobile diesels more added horsepower than any comparable turbocharger or supercharger installation!

The application of AiResearch Turbochargers to stationary diesel equipment will overcome excessive noise and smoke problems... jump horsepower to a much higher level... and cut your fuel bills on a horsepower per hour basis.

In addition, it will restore operating efficiency for your diesel power plants at altitude.

Application of these finely engineered power packages to mobile diesel equipment is equally effective... as has already been demonstrated in the remarkable results achieved by the installation of AiResearch Turbochargers on Caterpillar diesel machinery.

AiResearch is the largest producer of small turbomachinery in the United States, with twenty-five *million* hours of experience. This unmatched experience explains why AiResearch Turbochargers lead in power, economy and dependability. Your inquiries are invited.

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DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

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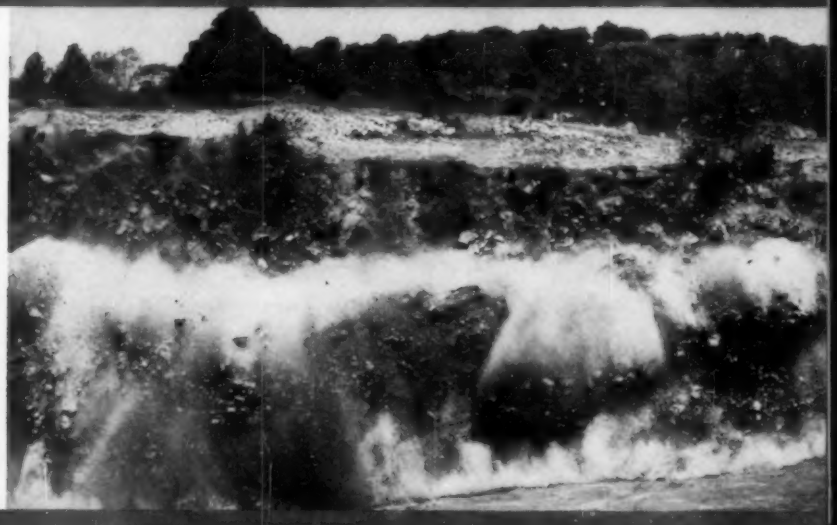

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XR56-5

PROTECT YOUR PROFITS ON BIG YARDAGE JOBS

with Bucyrus-Erie Ward Leonard Electric Shovels

This Bucyrus-Erie 110-B shovel is at work on a dam project to provide a dependable water supply system for fast-growing Colorado Springs, Colo. Here is just one more example of how contractors on large scale construction projects are ahead by using these big-output Ward Leonard electric shovels.

Experienced contractors recognize the many outstanding output advantages of these machines: superior front-end design that reduces deadweight but maintains strength, heavy-duty construction that keeps maintenance costs low and lengthens machine life, and smooth-acting Ward Leonard control for extra fast acceleration and deceleration to speed work cycles.

On big-yardage jobs, protect your margin of profit with a Bucyrus-Erie big-output Ward Leonard electric shovel.

71L55C

BUCYRUS-ERIE CO. SOUTH MILWAUKEE, WISCONSIN

75 years of service to men who shape the earth

Excavating Engineer
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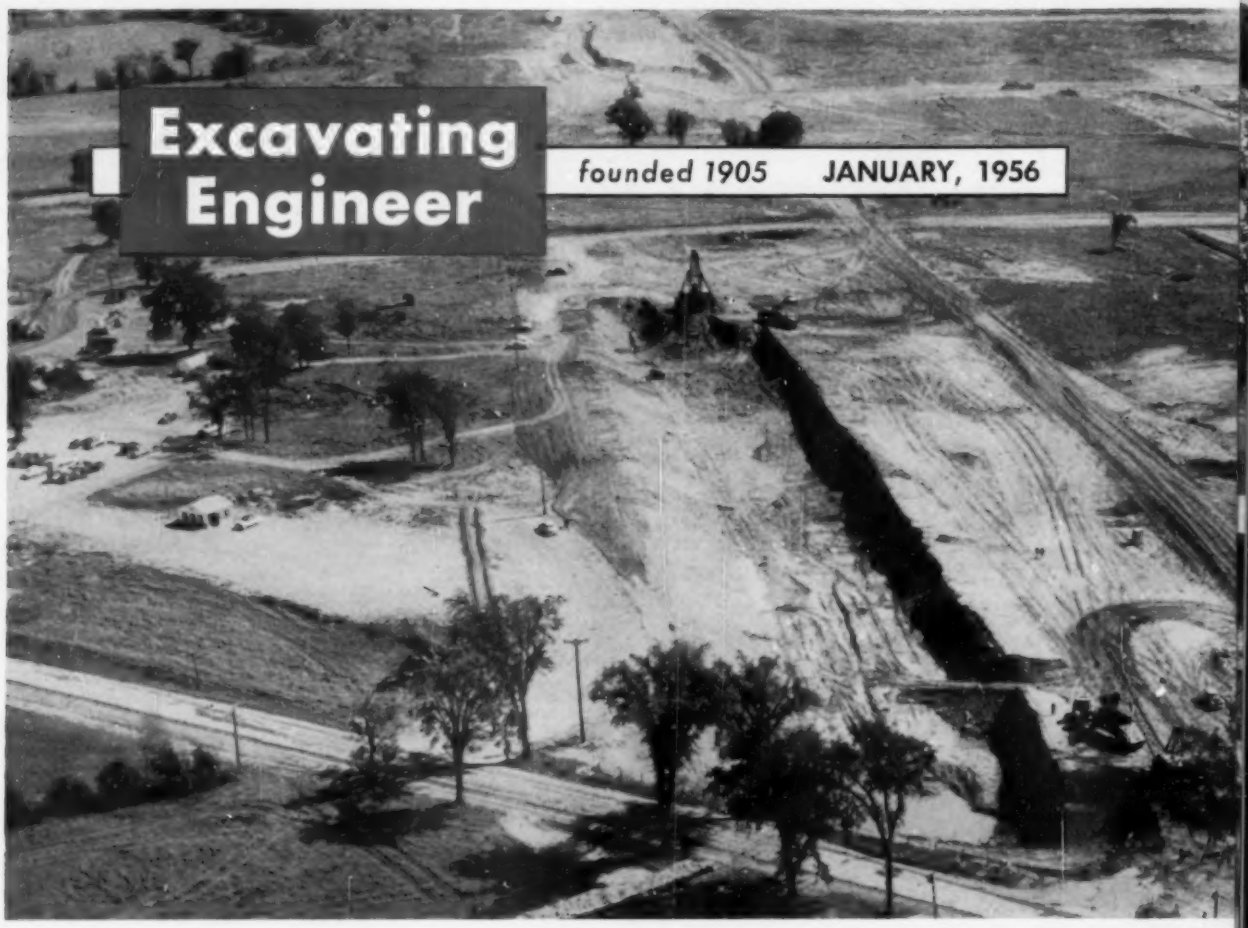


Peter Kiewit Sons' draglines carve out a section of the Long Sault Canal, a 10-mile-long bypass of Power project facilities.

Seaway, Power Shows Unfold

Awesome $900 million construction undertaking, scheduled to be finished in 1959, will provide huge power package and allow large ocean liners to make the trip from the Atlantic to Duluth.

COLOSSAL," Barnum might have said.

"Fabulous," would be the Hollywood-type label.

"Fantastic," some others would say.

"Nearly overwhelming," is *Excavating Engineer's* reaction.

We speak of the St. Lawrence Power and Seaway projects, an undertaking of the United States and Canada for which about $900 million will be expended in the next few years.

Earthmoving equipment worth millions of dollars and more than 6,000 men already have effected pronounced changes along the St. Lawrence River from Montreal, Que., to Ogdensburg, N. Y., a distance of 114 miles. Additional men and equipment will be channeled to the operation next year by construction firms that include some of the biggest enterprises in the industry.

Construction activity along the St. Lawrence, a clear, swift-flowing and beautiful river, represents two distinct but interrelated undertakings: 1, the St. Lawrence Seaway project and, 2, the St. Lawrence Power project.

Though it has received less publicity than the Seaway project, the Power project, which is necessary for the Seaway to be operative, is the more costly of the two. The $600 million Power project, to be financed by revenue bonds, is being developed jointly by the Power Authority of the State of New York (PASNY) and the Hydro-Electric Power Commission of Ontario (HEPCO).

After more than 50 years of planning and agitation, the Seaway soon will be realized at a cost of approximately $300 million. The United States' share will be about $90 million, to be paid by the St. Lawrence Seaway Development

Corp., created in 1954 by Public Law 358. Canada, through its St. Lawrence Seaway Authority, will pay approximately $215 million.

The Seaway and Power facilities are expected to have a profound effect on national, state and provincial economies.

The Power project is centered in the 46-mile International Rapids section of the St. Lawrence from Ogdensburg to Cornwall, Ont. Included will be construction of the Iroquois Dam, Long Sault Dam, the Barnhart Island Powerhouse, the Massena Intake (all concrete structures), and a cantilever truss bridge, dikes, plus channel improvements and considerable relocation of human beings, railroads and utilities.

The powerhouse, 3,120 ft. long, will be half in each the United States and Canada. Each country will construct half of it and each will share the power on a 50-50 basis.

And much power will be available—nearly 2 million KW overall—from the 32 turbine-generator units, 16 on each side of the powerhouse. Each unit can develop 85,000 hp at a maximum head of 87 feet with a full gate opening.

With this great new source of power, largely agricultural sections of New York and Ontario hope to strengthen their economy by attracting industry.

New York's "North Country," which is centered about 160 miles northeast of Syracuse and nearly 500 miles north of New York City, is particularly hopeful. Optimism is evident at Massena, N. Y., hub of the construction area for the Seaway and Power projects.

The Aluminum Company of America (Alcoa), located at Massena for half a century and the North Country's largest employer with 6,000 workers and an annual payroll of $30 million, has announced plans to invest $25 million to convert and expand its operations. Alcoa will obtain a substantial share of kilowatts from PASNY.

"It has long been our contention that one of our last frontiers will open with construction of the St. Lawrence Seaway and Power installations," said the *Rochester Democrat and Chronicle*.

Massena is even hopeful of obtaining a port. It also might well become a center of a large tourist industry. St. Lawrence State Park will be created by New York to offer visitors a play area and a view of the Seaway and Power installations.

The Power project will create the pool for the Seaway in this reach of the river.

For more than 50 years much had been said for and against an improved inland waterway—the St. Lawrence Seaway — extending from the Atlantic coast 1,000 miles above Montreal to Duluth on the western tip of Lake Superior, a total distance of 2,300 miles.

The stretch between Montreal and Duluth is not devoid of small-size ocean-going navigation, however. General cargo vessels of a maximum length of 250 feet, a maximum draft of 14 feet and a capacity of 1,500 short tons can make the entire trip. This is possible because a series of 14-ft. deep canals containing 22 locks exists between Montreal and Ogdensburg. The canals were built before the turn of the century by Canada, including the 18-mile Soulanges and 24-mile Lachine sections.

Navigation in the canals will be maintained during present Seaway construction. This will present one of the major problems to the dam builders. The

Work on the Seaway and Power projects proceeds steadily. Here, five Dutcher Corp. draglines excavate blue marine clay in Long Sault Canal's Grasse River Lock site.

river must be diverted back and forth without affecting water levels at the canal locks.

Two facts illustrate what a trade barricade the Montreal-Ogdensburg stretch represents: 1, 35-ft. navigation exists between Montreal and the Atlantic; 2, from Ogdensburg west to Duluth, a 25-ft. system generally exists, thanks to the locks at Sault Ste. Marie (connecting lakes Superior and Huron), Lake St. Clair, the Detroit and St. Clair rivers (connecting lakes Huron and Erie) and the Welland Canal (whose locks handle the drop in elevation from Lake Erie's 572 feet to Lake Ontario's 246 feet).

Sometime in 1959, if the present schedule holds, the Montreal-to-Ogdensburg barrier will have been eliminated. The United States is scheduled to:

1. Construct the Long Sault Canal, a 10-mile long bypass of the Long Sault Dam and Barnhart Powerhouse. The canal will have a bottom width of 442 feet and a maximum excavated depth of 54 feet and a controlling depth of at least 27 feet. Approaches to the canal will be dredged to the same controlling depth.

2. Construct two locks in the Long Sault Canal. The Robinson Bay and Grasse River locks each will be 860 feet long and 80 feet wide with a minimum depth of 30 feet above the sills. The maximum lift will be 49 feet. Usable lock dimensions for ships will be 768 x 80 x 30 ft.

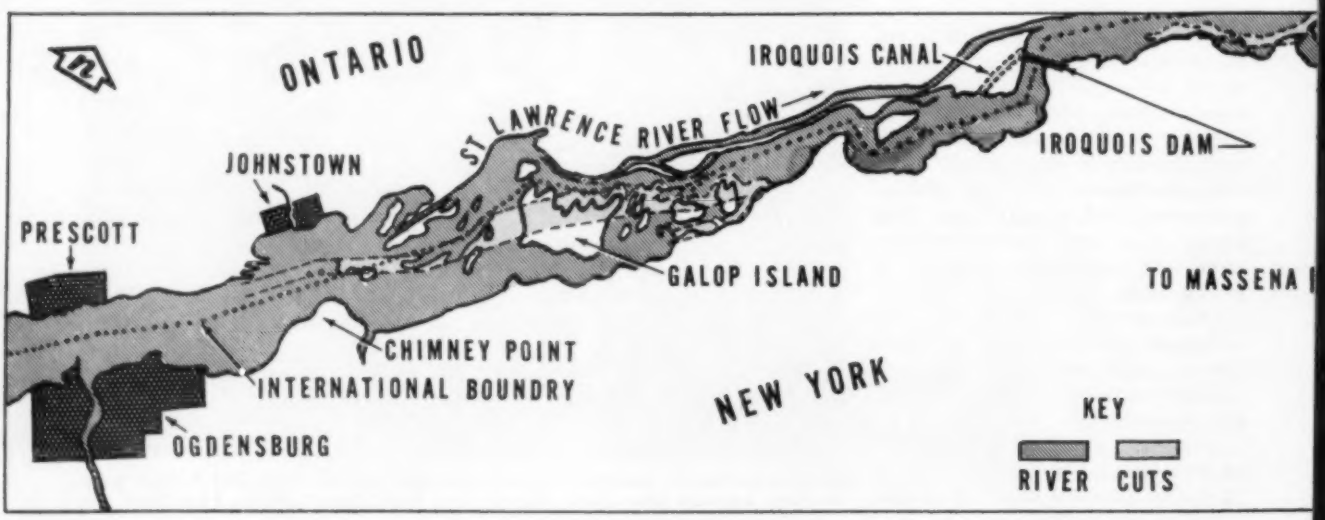
3. Lower rock shoals to a controlling depth of 27 feet and minimum channel width of 450 feet in the Thousand Islands section of the St. Lawrence.

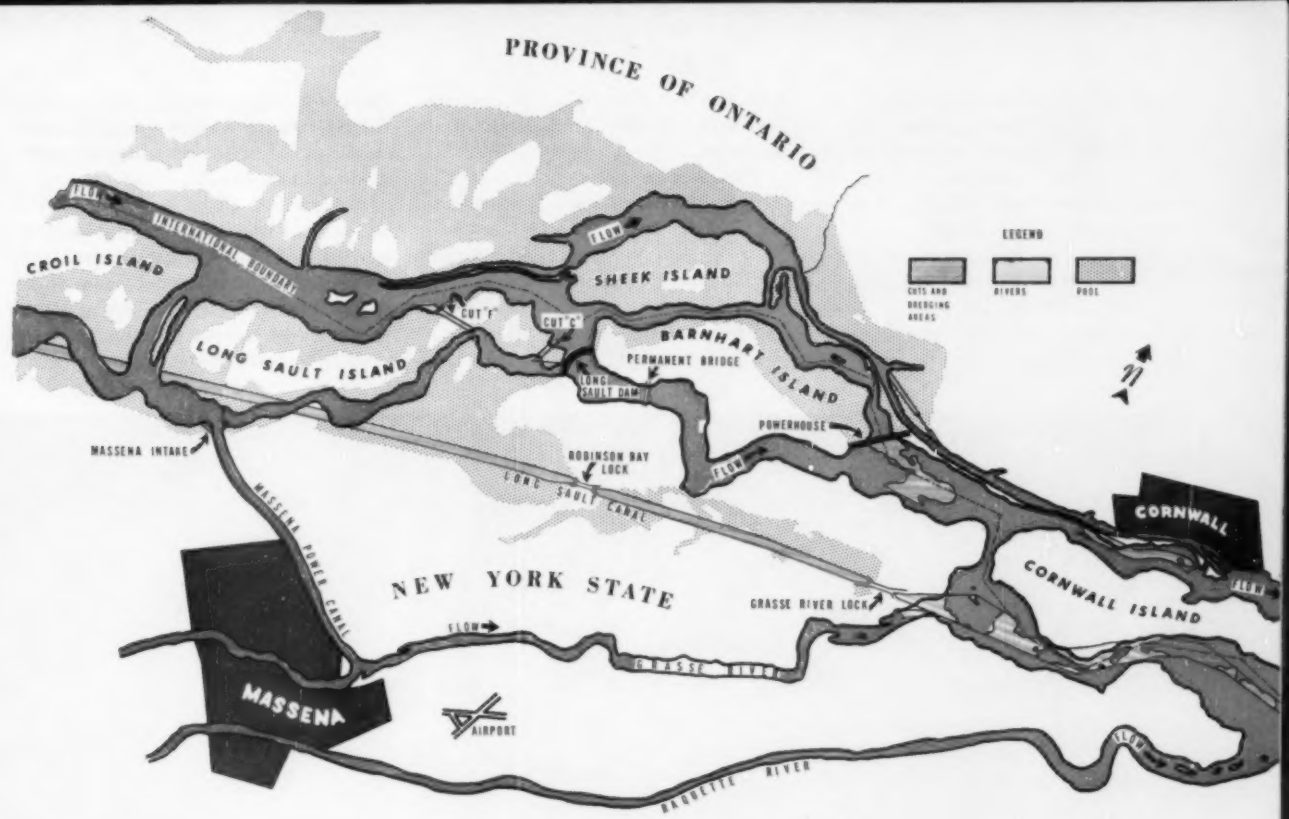
Canada's Seaway work, most of it centered in a section of about 70 miles between Montreal and Cornwall, includes:

1. Deepening of the channel between the locks of the 27-mile long Welland Canal, where necessary, to a controlling depth of 27 feet. The present available depth is 25 feet, but 17 miles have a draft of 27 feet. The locks already are 30 feet above the sills.

2. Construction of a one-mile-long canal and lock at Iroquois. This lock will be abreast of the Iroquois Dam.

3. Making 27-ft. navigation possible along the Canadian Seaway route, which will proceed downstream from Corn-





wall through Lake St. Francis, the existing Beauharnois Power Canal, Lake St. Louis and a new lateral canal on the south side of the river opposite Montreal. This job will embrace construction of an 18-mile-long canal and a total of four locks, rock removal and the dredging of shoal areas. Usable lock dimensions will be at least 768 x 80 x 30 ft. The controlling channel depth will be 27 feet.

When the Americans and Canadians finish this work, a 27-ft. course will be available from the Atlantic to the western end of Lake Erie. Before 27-ft. navigation (about 25-ft. draft) will be possible beyond that point, further channel and harbor improvements will be necessary. A bill is pending in Congress to authorize such main-line channel improvements.

With a 27-ft. channel available all the way from the ocean to Duluth and Chicago, the majority of the world's ocean-going vessels with profitable payload could make the 2,300-mile inland excursion into the heartland of America.

With 25.5-ft. draft available for navigation, the Seaway will accommodate general cargo carriers 460 to 500-ft. long with a 73-ft. beam and a capacity of 8,500 short tons and bulk carriers 710-ft. long with a 75-ft. beam and a capacity of 25,000 short tons.

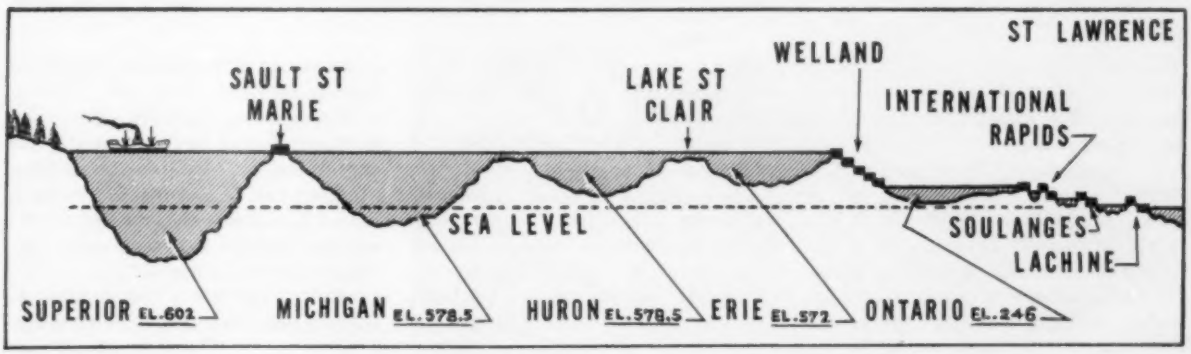
Foresees Heavy Shipping

According to St. Lawrence Seaway Corp. officials, about 10 million tons are carried annually on the existing canal. In the first full year of the 27-ft. system, in 1959, the Seaway Corp. foresees a traffic potential of approximately 36½ million tons. This figure is expected to rise to 52 million tons between 1965 and 1970, or about a third more than goes through the Panama Canal yearly.

One of the advantages of the Seaway will be that it will provide a cheap avenue of transportation of iron ore from the new fields of Labrador to the hungry blast furnaces of the Midwest.

Agitation by Ontario, which was seeking a much-needed additional source of power, helped hasten the start of the Seaway and Power projects in 1954.

A bill that would have authorized United States participation with Canada in the joint Seaway-Power projects was defeated by the Senate in 1952 by a close vote. Later that year, however, the governments of Canada and the United States, after filing applica-



tions with the International Joint Commission (which has regulatory control over works changing water levels in the upper St. Lawrence River), received approval to develop power in the International Rapids section.

A license for the development of the U. S. portion of the hydro-electric project was issued by the Federal Power Commission in July 1953. An executive order of November 1953, signed by President Eisenhower, named PASNY as the construction entity to develop power on the United States side of the international boundary. The U. S. Circuit Court of Appeals, District of Columbia, upheld the validity of the license issued to the Power Authority by the FPC; on June 7, 1954, the U. S. Supreme Court handed down a decision refusing to review the circuit court's decision. HEPCO was designated by the Canadian Government as the construction entity on the Canadian side of the boundary.

The decision by Ontario and New York to develop the power was not the only factor which nudged the United States into action on the Seaway project.

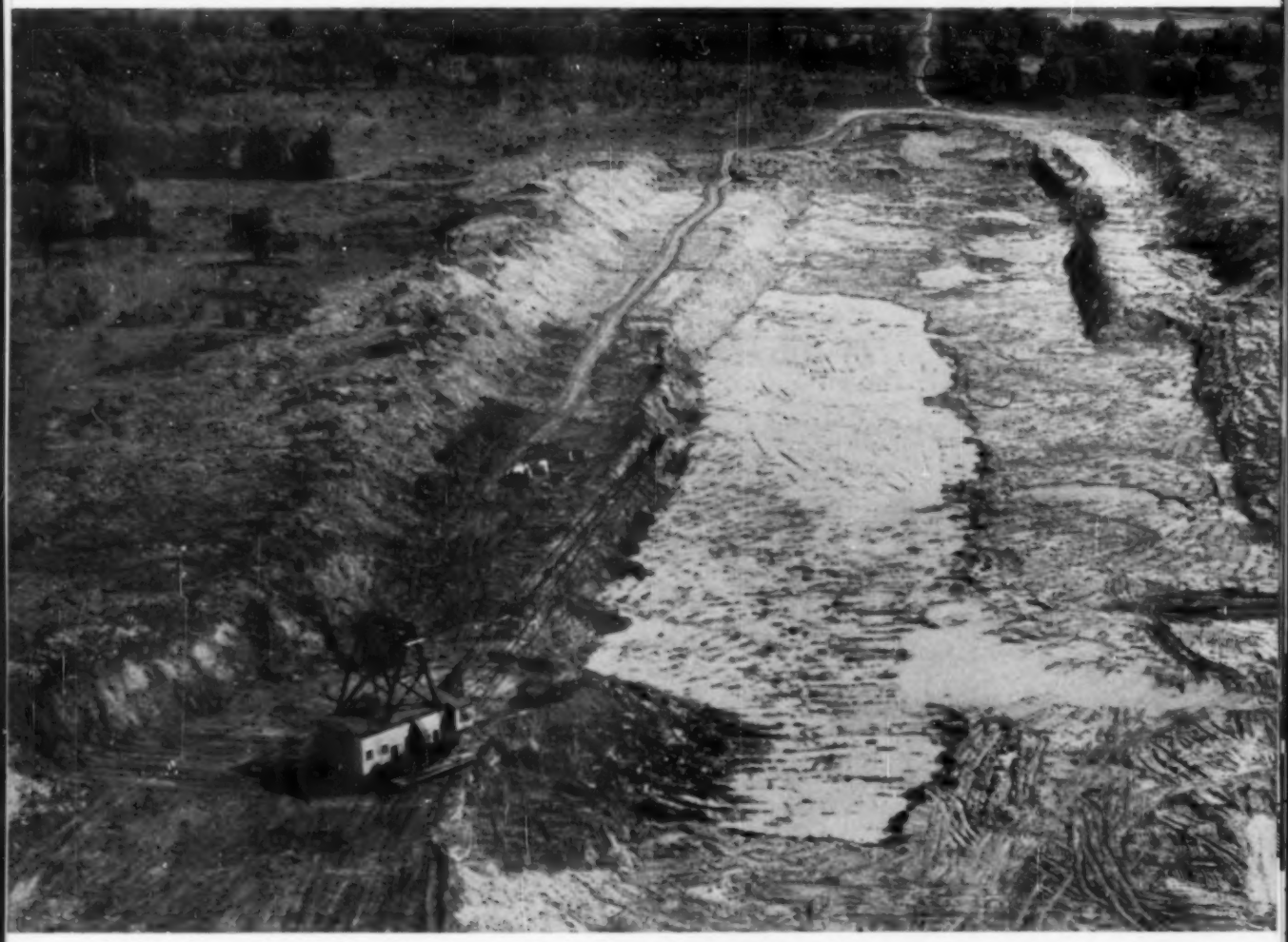
Of considerable importance was Canada's announced intention to construct the Seaway itself. So spurred, Congress passed Public Law 358, which authorized U. S. participation with Canada in construction of the Seaway. President Eisenhower signed the bill in May 1954. The United States has appropriated $105 million for the Seaway.

The amazing thing—maybe phenomenal is the better word—is the swift manner in which the projects were initiated after the Power Authority was reorganized and the Seaway legislation approved. Equally amazing is the time limit for completion of the projects, which, taken as a whole, probably ranks as one of the largest construction undertakings in history.

Activity on all phases of the Power project started shortly after the Power Authority was reorganized in March 1954 and Robert Moses became chairman. Interim financing was obtained in July and detailed planning was begun. The first contracts were awarded in August 1954. Some work commenced immediately.

Through Oct. 1, 1955, the Power Authority had in force 19 construction and 31 major supply contracts totaling $139,946,532. Construction contracts ranged in value from $100,000 to $37 million; supply and equipment contracts, $50,000 to $14 million.

HEPCO on Oct. 1 had in force 14 construction contracts and 11 major



A 650-ton Bucyrus-Erie 450-W walking dragline, *The Gentleman*, dwarfs nearby machinery in excavating a portion of the canal.

supply contracts totaling $85,500,000.

The Seaway Corp. at that date had contracts in effect valued at more than $12 million.

The St. Lawrence Seaway Authority, created in 1951, awards Canadian Seaway contracts. At this writing, the Authority had awarded 22 contracts for construction and dredging amounting to $50 million. These contracts range in value from $121,000 to $8,219,000.

View toward the Barnhart Island bridge (above) shows boiling water of the St. Lawrence. Bottom view shows closeup of bridge construction. The bridge now is open.

Now that the projects have begun, speed is the guide word of governmental agencies, engineers and contractors. One gets that obvious impression after a thorough visit of the projects. Some of the contractors keep their jobs working around the clock.

Much of the work is scheduled to be finished in 1958. That fall officials plan to complete within six days the buildup of the head pond for the Power project;

What is reputedly the longest cofferdam in the world (4,200 feet and 60 cells) closes off the north channel of the river to allow work on the Barnhart Powerhouse.

the first sale of power is scheduled for 1958. The project is scheduled to be completed in 1959.

A relation here of some of the construction figures may provide an insight into the magnitude of the projects. Excavation for both projects—Canadian and American sides—will total about 150 million cubic yards, including about 100 million on the Power project.

Power project structures will require approximately 3 million yards of concrete. An additional million yards of concrete will be used in the Long Sault Canal locks. Canadian Seaway concrete figures are not available.

One Aggregate Supplier

All aggregate for the concrete in the American Power project structures—some 950,000 tons of sand and 2,500,000 tons of rock in four sizes—will be provided by Tecon-Grafe-Callahan, Dallas, Tex., whose aggregate plant is located at Norwood, N. Y., 12 miles south of Massena. The aggregate plant, already in operation, has a capacity of 700 tons per hour. The aggregate will be delivered to job sites by rail and truck.

Grouting alone on the American side of the powerhouse job may require about 500,000 bags of cement to seal off the rock foundation against artesian seepage.

An 11-mile system of dikes for the Power project on the U. S. side will require about 17 million cubic yards of materials.

The United States and Canada are sharing equally in the cost of the Power project. The United States has more structural work, but Canada has a greater relocation problem.

The flood area will embrace about 20,000 acres. The Canadians must relocate the entire city of Iroquois, which has a population in excess of 1,000. In all, more than 6,000 persons will be moved by HEPCO from cities, farms and hamlets. Houses already are being moved to the new Iroquois.

HEPCO also must relocate 34 miles of highway and 40 miles of railway.

The job on the New York side of the river includes 28 miles of new road, seven miles of new railroad and the relocation of four miles of railroad.

Eight miles of power transmission lines which crossed the powerhouse and reservoir areas had to be relocated at a cost of $1 million.

A permanent three-span cantilever bridge to carry rail and vehicular traffic to Barnhart Island from the United States mainland is part of the Power project. After the project is completed, the bridge will provide access to the powerhouse, Long Sault Dam and St. Lawrence State Park.

The bridge cost in excess of $6 million. The contract for its substructure was awarded to A. S. Wickstrom, Inc., Skaneateles, N. Y. Mt. Vernon Bridge, Mt. Vernon, Ohio, obtained the contract for steel erection, which was being handled under subcontract by the American Bridge & Steel Co., Ambridge, Pa.

The permanent bridge was opened last month (December) after one construction season to replace a temporary $1 million floating bridge put in place last spring. The temporary structure consisted of a pair of 250-ft. through-truss steel spans. Walsh Construction Co.

built the super-structure of the temporary bridge. Wickstrom installed the bridge abutments.

Last winter, two tunnels of corrugated steel pipe, one for trucks and the other for pedestrians and a conveyor belt for materials, were built under the Cornwall Canal for access to the Power project from the Canadian side.

Also last winter and spring—and they say that it was a tough winter—two interesting and difficult phases of the Power project were completed. These were the erection of cofferdams and dewatering of the powerhouse area and the erection of the Stage 1 cofferdam at the Long Sault Dam site.

Tough Cofferdam Jobs

What with the rugged weather, a St. Lawrence river that is deep and has currents 15 to 22 mph, and tough earth to bore through, the job of erecting the cofferdams was difficult.

(The average monthly flow of the St. Lawrence is 246,000 cfs; the minimum and maximum monthly figures are 154,000 and 323,000 cfs, respectively.

Mannix-Raymond, a Canadian firm, built the upstream and downstream powerhouse cofferdams under a $2½-million HEPCO contract. The downstream cofferdam, 4,200 feet long, is reputedly the longest cofferdam in the world. It contains 60 cells, each 65 feet in diameter and 50 to 60 feet in inside depth. The cofferdams closed off the north channel of the St. Lawrence. The area was dewatered of 650 million gallons in late June.

Dravo Corp., Pittsburgh, Pa., erected the Stage 1 cofferdam at the Long Sault Dam site under a $1,913,250 contract. This L-shaped cofferdam of 26 cells extends from the mainland to midstream, then west to the eastern tip of Long Sault Island. The centers of the cells are 51.8 feet apart. The steel piling has a maximum length of 47 feet 9 inches. A smaller cofferdam is located upstream.

A small channel across Long Sault Island—Cut C—diverts the flow from the south to north channels around the cofferdam. When the first half of the dam is completed, the Stage 1 cofferdams will be removed and cut C will be plugged. The Stage 2 downstream cofferdam will be erected from the southwestern tip of Barnhart Island to midstream, then to eastern Long Sault Island. A large rock fill cofferdam will be built across the main river channel just above the famous Long Sault Rapids. A large diagonal channel—Cut F—excavated through Long Sault Island will divert the flow through the completed half of the dam and allow construction of the other half.

Another impressive cofferdam, this one of 26 cells, closes off the south channel of the river and permits first-stage construction activity on Long Sault Dam.

Peak Seasons Ahead

Serious excavation for the Seaway and Power facilities began last summer. Some time was necessarily spent gathering men and equipment and erecting plant facilities. The peak production seasons are yet to come (1956 and 1957).

That considerable progress already has been made, however, is indicated in the fact that from April through September 21% of the excavation on the Long Sault Canal and lock sites had been completed. Work on the Power project also is progressing. Some concrete has been poured.

Attaining good yardage figures in excavation does not come in that country without good equipment and plenty of scheming, fuming and just plain hard work.

Most of the dirt to be moved is either glacial till or blue marine clay. Glacial till is silt and soil imbedded with rock of various sizes. It has a density, thanks to the Great Glacier, of 140-145 pounds, about the same as for concrete. Operators find the digging difficult.

Marine clay is another contractor's nightmare. It is wet and sticky—they call it "goop" up there—and it clings tenaciously to buckets and earthmoving equipment. Maintaining haul roads over marine clay is a serious problem.

When engineers found that they could not avoid using marine clay as a foundation for dikes, they tested the material extensively. The result was flattened slopes on the marine clay areas, making the embankments a kind of floating structure.

Uhl, Hall & Rich Engineers

This testing for the Power project was done by Uhl, Hall & Rich of Boston, Mass., the consulting engineers for the Power Authority, with help from

While digging, loading and drilling continue on the two big projects (left, center and upper right), navigation is maintained on the present 14-ft. system (lower right).

the New York Department of Public Works. Resident engineer for PASNY is William H. Latham.

Uhl, Hall & Rich is performing the engineering studies, preparing the designs and specifications and handling the overall project supervision and management. The firm quickly mobilized for its gigantic and historic task.

A number of studies on a potential St. Lawrence international power project had been made. A 1941-'42 Corps of Engineers report, with additional data supplied by Uhl, Hall & Rich in its report of 1954, is essentially the basic plan of the project.

Uhl, Hall & Rich, a subsidiary of Charles T. Main, Inc., has 220 engineers working on the project site and a large staff of designers in its Boston office. Included on the force are many seasoned dam and hydroelectric designers and builders from the Bureau of Reclamation and the Tennessee Valley Authority (TVA).

Project manager at the site is Frank Matejka, who recently completed an assignment as head engineer on the Sariyan Dam and hydroelectric project in Turkey. Ellis L. Armstrong is project engineer and assistant project manager. He joined the organization from the Bureau of Reclamation. He has the construction of seven dams and the design of 30 others, all in the West, to his credit and has had assignments such as consultant on the Aswan Dam on the Nile River in Egypt.

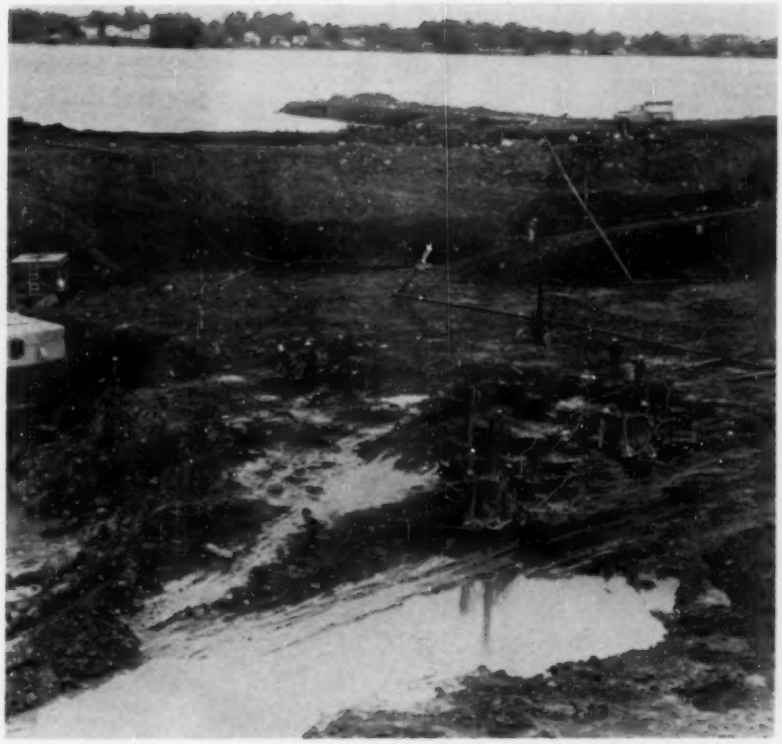
Area construction managers are S. N. Smith, veteran hydro-electric dam builder from the TVA, and R. E. Burnett, a former construction engineer with the Bureau of Reclamation in California. Resident engineers include Jim Hendricks at Barnhart Powerhouse, Pete Olson at Long Sault Dam, Hugh Fields at the Massena Intake Dam, John Officer on dikes, roads and relocations, Ad Wilbur at Iroquois Dam and Robert Brown on the channel excavations. All of these men have spent their full careers on this type of construction.

The engineers cut two years off the original completion date of the project, an important factor because there will be an estimated $3 million a month in power revenue in those 24 months.

Dr. R. L. Hearn is HEPCO chairman and Dr. Otto Holden is chief engineer. Gordon Mitchell is HEPCO'S project director; William M. Hogg is field project engineer.

Robert Moses is chairman of PASNY. W. S. Chapin is general manager and J. Burch McMorran is chief engineer.

Lewis G. Castle is administrator of the St. Lawrence Seaway Development Corp. Secretary of the Army Wilber M. Brucker exercises executive direction. M. W. Dettershagen is deputy administrator. Raymond Stellar is chief cor-



poration engineer. Luke Hale is resident engineer.

The Corporation selected the Corps of Engineers, U. S. Army, as its design and construction agent. The Corps is handling the assignment primarily out of its Buffalo (N. Y.) office. Col. L. W. Olmstead is district engineer; S. B. Hunt, chief of the engineering division; and T. F. Airis, area engineer at Massena.

Problems of international relationships in such a gigantic international undertaking seem to have been handled in stride by Canada and the United States. Each side is doing its own engineering, but the engineers co-ordinate their problems.

File Joint Application

In 1952, Canada and the United States, in filing the applications with the International Joint Commission, created the St. Lawrence River Joint Board of Engineers which must approve and supervise aspects of the power project.

General A. G. L. McNaughton is president of the Canadian section of the International Joint Commission, which regulates the water levels and flow of the St. Lawrence River. Len Jorden, former governor of Idaho, is chairman of the United States section.

Excavating Engineer representatives took a long, first-hand look at the St. Lawrence projects in early Autumn. Most of the active jobs on both projects along the St. Lawrence on the United States side of the international boundary were visited. A report of what was seen follows on these pages. Each job will be treated individually.

Limits of time prevented visits to the Canadian operations. *Excavating Engineer* hopes to visit them later.

Both the veteran and casual observer might look upon the St. Lawrence projects with awe. This especially would hold true when one considers the relatively small stretch of territory in which much of the awe-inspiring and historic projects are located; the small amount of time allotted for their completion; the construction obstacles to be overcome; the importance of the Power and Seaway facilities; and the amount of time, money, equipment and skills being funnelled into the major undertakings.

The St. Lawrence projects might well come to be grouped with the outstanding construction undertakings of all time.

Now, however, a visit to the projects is in order. Next stop, the Long Sault Canal diggings, near Massena, N. Y. . . .

Almost 15 cubic yards of clay are released from the bucket of *The Gentleman*, which is excavating 7,600-ft. section of the canal.

I. Seaway, Power Story:

'The Gentleman' Takes Ungentlemanly Bites

LANKY H. A. (Slim) Tedder drawled that the quickest way to see *The Gentleman* at work would be to climb aboard a small power boat with him for a five-minute trip down the St. Lawrence River to the southern end of Long Sault Island.

The Gentleman is a 650-ton Bucyrus-Erie 450-W walking dragline owned by the Badgett Mine Stripping Corp. of Madisonville, Ky. It is one of the most striking pieces of machinery engaged on the St. Lawrence projects.

Tedder brought the boat into the shore at Long Sault Island, indicated the route to take to find *The Gentleman* and waved a temporary goodbye. Badgett's project manager had some urgent business to transact on the mainland.

What followed seemed like minor-scale mountain climbing over sticky, mushy—and yes, smelly—marine clay. A frog leaped past, further indicating the nature of the material.

The "mountain" was made by *The Gentleman*, which has the job of carving a 7,600-ft. long section of the Long Sault Canal across Long Sault Island. At the time of our visit, *The Gentleman* already had made a sizeable impression on the topography of the island.

A spectacular view of *The Gentleman*

Continued on page 66

650-ton walking dragline, a veteran of the Kentucky coal fields, has 3-million-yard earthmoving assignment in a 7,600-ft. section of the Seaway's Long Sault Canal. It moves 500 yards per hour.

Two Badgett principals on project, Slim Tedder (left) and Floyd McMeans, confer.

Aerial view of Richards Point excavation on the mainland shows Bucyrus-Erie 5-W loading dirt into Euclid hauling unit.

Another 4½-yd. load of dirt is dropped into Euclid by the 5-W, a veteran of the coal-stripping business in Kentucky.

(Above) Allis-Chalmers crawler gives Euclid scraper unit an assist. (Below) Euclid TC-12 crawler clears land on island.

All over the Seaway...THE

OGDENSBURG, N.Y.—This Bucyrus-Erie 200-W walking dragline and a 450-W walking dragline are working on a $6-million channel improvement contract involving 6 million yards of common and 500,000 yards of rock on the mainland, underwater and on islands near Ogdensburg.

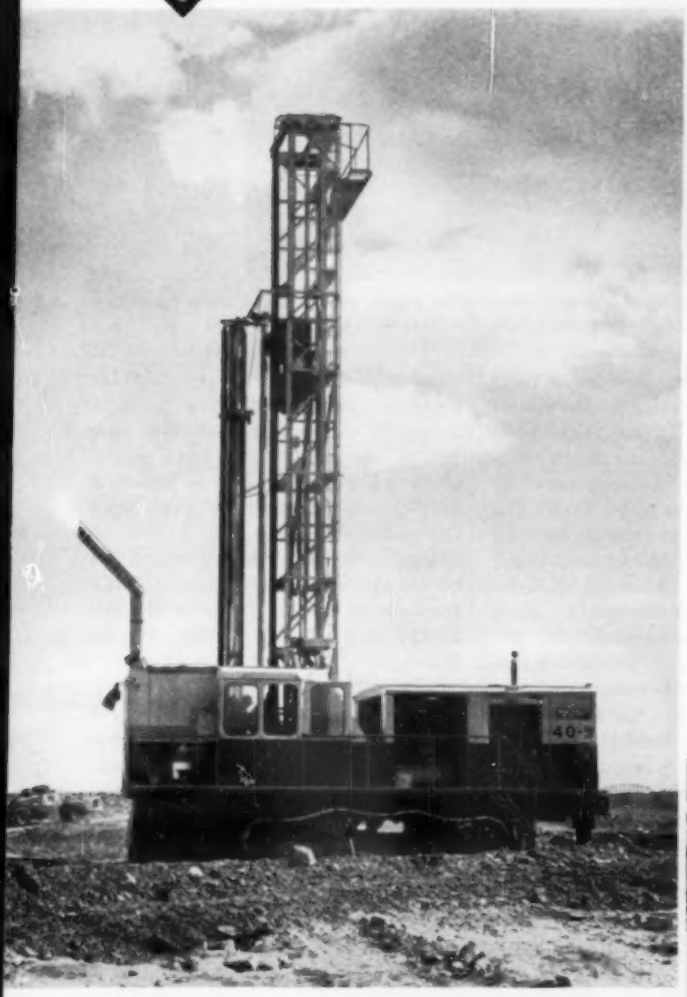
LONG SAULT CANAL—A new Bucyrus-Erie 71-B dragline with a 4½-yd. bucket is working on a five-mile section of the Long Sault Canal involving excavation of almost 13 million yards of dirt. Also assigned to this project is a 6-yd. Bucyrus-Erie 5-W walking dragline. Completion is scheduled for the end of 1957.

MASSENA, N.Y.—Nicknamed, "The Gentleman," this Bucyrus-Erie 450-W walking dragline is digging a 7,600-ft. section of the Long Sault Canal across Long Sault Island near Massena.

CHOICE IS BUCYRUS-ERIE

On one of the biggest construction jobs of the century ($600-million International Rapids power development and $300-million St. Lawrence Seaway), Bucyrus-Erie shovels, draglines, cranes and blast hole drills are playing an outstanding role — as they are doing on other big engineering projects the world over. Here are a few of the many Bucyrus-Erie machines included in the huge construction force concentrated on the banks of the river. 54Y56C

MONTREAL, CANADA — A Bucyrus-Erie 40-R rotary blast hole drill speeds rock preparation on the Lachine Rapids section of the Seaway opposite Montreal harbor. Excavation for this section is about 3,400,000 yards. Material drilled consists mainly of black shale intruded by bands of very hard igneous rock.



OGDENSBURG, N.Y. — Much of the 2.7 million-yd. excavation for the Iroquois control dam, 25 miles upstream from Massena, N. Y., will be handled by two Bucyrus-Erie 6-yd. 150-B shovels. This dam, costing nearly $14 million, will maintain the levels of Lake Ontario.

MASSENA, N.Y. — Here is one of two Bucyrus-Erie 2½-yd. 54-B's digging and loading out earth and rock on the $25-million Long Sault Dam. On the same project is a Bucyrus-Erie 38-B dragshovel and a 22-B Transit Crane.

BUCYRUS ERIE

South Milwaukee, Wisconsin

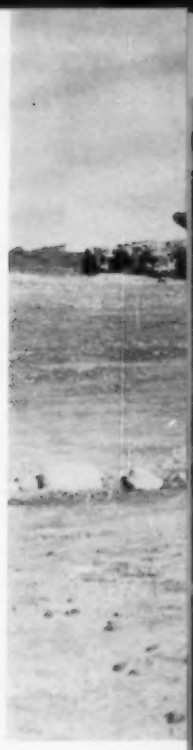
II. Seaway, Power Story:

Two Giants Team Up for Large Dirt Job

TALK about moving a lot of dirt. Peter Kiewit Sons' Co. and Morrison-Knudsen Co., Inc., two giants of construction, will be responsible in joint venture for the excavation of nearly 19 million yards of material under two contracts on the Seaway and Power projects.

One contract, from the Seaway Corp., calls for the excavation before Dec. 24, 1957, of 12,700,000 yards from a five-mile section of the Long Sault Canal. The contract price is $6,452,540.

The other contract, which is to be completed by next September as a subcontract for the Long Sault Dam joint venture, involves the excavation of 6 million yards from what is known as Diversion Cut F. Cut F will divert the north channel flow of the St. Lawrence River through the completed half of Long Sault Dam, enabling the main channel to be closed off for construction of the other half of the dam. Control of flow through Cut F will make possible the continuance of 14-ft. navigation in the Canadian Ship Canal.



Kiewit-M-K must excavate nearly 19 million yards from canal, Cut F. Here, a 6-yd. Bucyrus-Erie 5-W dragline works on canal.

Kiewit Sponsors Jobs

Kiewit is sponsor of both jobs and is handling both from a central base of operations in a farm house near the canal cut. The $3,500,000 Cut F job was subcontracted to Kiewit and M-K from the five joint venturers on the Long Sault Dam job—Walsh (sponsor), Perini, M-K, Kiewit and Utah.

Considerable equipment already had been placed into service on the two jobs at the time of *Excavating Engineer's* visit. More was coming, including a Bucyrus-Erie 9-W walking dragline capable of moving 15 yards in one bite. The 9-W traveled to Massena from Sims Port, La., on a barge in about five weeks.

By Oct. 1 Kiewit-M-K had moved about 1 million yards—or one-sixth of the total excavation—from Cut F.

Excavation on the canal job, however, was still in its early stages. Less than 400,000 yards had been moved by Oct. 1. Save for the locks, the Badgett and Kiewit-M-K contracts account for all the excavation on Long Sault Canal.

Digging on Cut F's glacial till is difficult. Assigned to the job by Keith Wasson, the project sponsor, were:

Three 5-yd. Bucyrus-Erie 120-B electric shovels; a 5-yd. Manitowoc 4500 dragline, powered by a Cat D386 diesel; 15 butane-burning Euclid 11LBT bottom dumps (30 yards heaped capacity); and six new Cat D8 dozers, both torque converter and direct drive models. Much of the equipment had been used on the Garrison Dam project in North Dakota.

"This glacial till is the funniest dirt we ever worked in," said one Kiewit official on Cut F. "The shovel has to work hard to dig it, yet the haul roads made out of the stuff have difficulty supporting our hauling units. We have to use all the way from three to four feet of shot rock to build roads on top of the excavated glacial till. The Cats have to work continually to maintain the roads."

Cut F is about 1,800 ft. long and will be 600 ft. wide. The deepest cut will be about 90 feet. Slopes generally will be 1½ on 1.

Cut F Material Is Spoil

All the excavated material on Cut F will be spoiled. The job also involves some channel straightening. Underwater excavation will amount to about 750,000 yards.

Kiewit had done some experimental drilling and blasting, using Davey air, Joy and Mayhew rotary, Gardner-Denver percussion and Bucyrus-Erie 42-T churn drills.

A 120-B electric shovel and a Bucy-

Joint venturers Kiewit and Morrison-Knudsen battle a tough foe, glacial till. They'll move 12.7 million yards of material from five-mile canal section and 6 million yards from a diversion cut.

Also active on the Long Sault Canal job are two other Bucyrus-Erie machines—120-B electric (left), 71-B diesel dragline.

rus-Erie 5-W, equipped with a 6-yd. dragline bucket, were active on channel excavation the day we visited the job. When the machines hit good dirt, it was hauled to the dike being built south of the channel. The dike will take 1 million yards of select material. Other dirt is spoiled.

Also assigned to the channel job were a Bucyrus-Erie 71-B dragline, powered by a GM diesel and carrying a 4½-yd. bucket; a 2½-yd. Northwest 80-D shovel, powered by a Murphy diesel; 13 11LBT Euclid bottom dumps and two 46TD Euclid end dumps; 12 D8 and one D9 dozers and one D6 high-lift.

The channel slopes are 1½ on 1. Kiewit officials hope to have 60% of the channel excavation completed by next Oct. 1.

Lubrication and minor maintenance is done in the field; major repairs are handled in a large, well-equipped shop near the farm house headquarters.

The jobs were maintaining two eight-hour shifts six days a week. About 300 men will be employed on both jobs at the peak of activity.

Personnel

Kiewit officials on the job include: Wasson, project sponsor; Mike Evans, general superintendent; Clint Arnot, general project engineer; George Keyes, general superintendent, canal excavation; Angelo Weir, general superintendent, Cut F; Jim Nelson, project engineer, canal; Bill Noren, project engineer, Cut F; and Bill Giroux, mechanical superintendent.

Tough glacial till on Cut F is shown being loaded to Euclids by two veteran 120-B electric shovels. Excavation on Cut F is expected to total about 6 million yards.

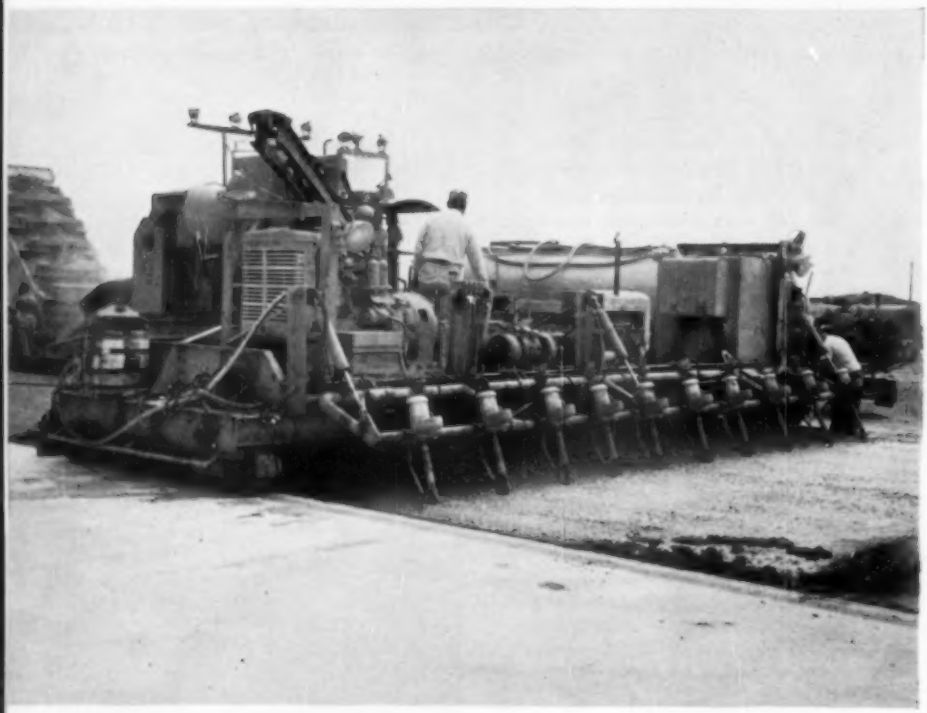
Assigned to the Cut F job is this Manitowoc 4500 dragline carrying a 5-yd. bucket.

A PICTURE REPORT OF

INTERNATIONAL POWER

Boosting job production everywhere

Morrison-Knudsen Co. and Landers & Griffin Inc., joint venturers on $17,000,000 Portsmouth (New Hampshire) Air Base, are laying 423,000 cu. yds. of concrete with this spreader. Its 10 International-powered vibrators continuously work a strip 25 ft. wide, 14 inches thick. All concrete is being laid for 200 x 11,620 ft. runway and 1,000 x 8,500 ft. apron. Also on the 5,788,000-yd. job are 6 TD-24 torque converter pushers and 16 self-propelled scrapers. Their output on 10,000-ft. cycles averages 1,400 pay yds. hourly.



This International "300" tractor is economically doing a job normally assigned a much bigger, more expensive machine . . . moving 1000 cu. yds. Heaping 8 cu. ft. of sandy loam per load, it completes a 100-ft. cycle every 1½ minutes. "300" is building a running track for a school in Greenville, Mississippi, will take 7 to 10 days.

3000-ft. cycle every 3 min. is the record of Western Construction Co's "55" Payscraper. This includes time for TD-24 to push-load 10 pay yds. of ripped caliche. Area, near El Paso, Texas, was once considered too steep and rocky for development. Soon, thanks to International power, it will be graded and terraced for 250 quarter-acre lots.

"Ideal for dozing rock," says Paul Weaver, Supt. for Joe Wenke Quarries, of this veteran TD-14A. "We use it continuously for shovel and quarry-floor cleanup. Performance has been excellent. Downtime is way down, due partly to rugged construction, partly to prompt parts delivery service from our International distributor." Quarry, located at Toledo, Iowa, produces 200 tons of 1-inch road stone per hour.

Fast on job, fast between jobs—Handling all tractor work in a quarry near Denver, Colorado, 200 hp TD-24 saves time by driving job-to-job at 7.8 mph. Output, 2200 tons of 1¼-inch stone per 8-hour shift, is taken from crusher by International-powered belt conveyor, background, then stockpiled by TD-24. Unit also does all stripping.

Ripping 150 yds. of concrete in front of a Camden (New Jersey) filling station was a job too tough for a ¾-yd. shovel, according to engineers. Al Pangia's International Drott TD-14A, however, did the work unassisted. Unit's tremendous break-out force, 17,000 lbs, broke up the slab . . . even tore out 5-ft. concrete footings.

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ALSO: International Drott Loaders . . . International Scrapers, Bottom-Dump Wagons . . . and International Superior Pipe-Boom Tractors

III. Seaway, Power Story:

Clay Presents a Sticky Problem

Three Dutcher Corp. draglines—(from right) a Marion 111-M, Northwest 80-D and Lorain 85—excavate for the Grasse River Lock.

DON Dutcher knows what treacherous material blue marine clay is. He's been kicking around in the stuff since last spring when the Dutcher Construction Corp., Queenstown, Md., began excavating for the Grasse River Lock, one of the two locks in the Long Sault Canal.

Dutcher, vice president of the corporation, is serving as project manager on the lock job.

By Feb. 20 the Dutcher firm is scheduled to have completed its $2,197,843 job, which involves 3,100,000 yards of excavation and 420,000 yards of borrow for use on dikes.

Dutcher's contract is for excavation and dikes. Actual concrete construction of the Grasse River and Robinson Bay locks, involving additional excavation, will be covered by other contracts scheduled to be awarded soon by the Buffalo District Corps of Engineers with the Seaway Corporation's approval.

Grasse River Lock will be about 860 ft. long and 80 ft. wide. Dutcher will excavate down to bed rock, an average depth of 75 to 80 feet.

Don Dutcher, vice president and project manager, checks a stake in marine clay.

"The top 15 feet was brown clay," said Garey Norris, Dutcher's project engineer. "Then we hit blue marine clay, which we're in now, and that goes down 40 feet. The remaining material down to bed rock is glacial till."

Because of the marine clay, Dutcher's excavation is on a slope of 1 on 10. At best, the squashy clay is difficult to handle; when it rains—well, headaches among Dutcher and his personnel mount.

Excavating Engineer visited the Grasse River Lock job on an afternoon that was bright and mild. No appreciable rain had fallen for several days; still, the marine clay reflected its slippery character.

Five draglines—two Marion 111-M's, a Lorain 85, Northwest 80-D and Koehring 1005 — were attacking the clay. The two Marions and the Koehr-

Dutcher Corp. has been encountering slippery blue marine clay since last spring as it excavates for one of the two locks in the canal. Overall excavation amounts to 3.1 million yards.

(Left) A Koehring 1005 dragline prepares to dump load into C & D Movall wagon. (Right) A 3-yd. dragline dumps its load.

ing carried 4-yd. Yaun buckets; the Lorain, 3-yd. Esco; and the Northwest, 3-yd. Yaun. A P&H 1055 dragline, carrying a 4-yd. bucket, also was scheduled to be placed in the excavation.

The draglines were loading to 12 C & D Movall wagons, pulled by Cat DW21 rubber-tired tractors, and eight Euclid end dumps (four Model 46 and four Model 91).

Keeping open haul roads over the marine clay is a difficult and continuing problem. Three Cat Model 12 motor graders and some of Dutcher's 12 Cat D8's were assigned to that important function. Gravel for the road was being loaded out on the property by a 1¾-yd. Link-Belt Model 370 shovel.

The spoil area originally was about 4,000 feet away from the excavation; the distance has been progressively reduced.

To pile the spoil higher, Dutcher was employing a Cat D9 with an extended blade. The 20-ft. extension arms were welded to the machine's C-frame. Dutcher also had another D9 on the job.

The spoil will be contained on three sides by dikes extending 6,500 feet. One side of this dike, a 2,500-ft. section known as Dike 8-A, will serve as a roadbed for relocation of the New York Central Railroad.

For protective purposes—in case of a winter ice jam on the river, for instance—a 1,400-ft. long earth cofferdam was constructed between the Grasse River and the excavation.

Keeping the work area dry were 19 Fairbanks-Morse deep well turbines. The pump houses were evenly spaced around the south-eastern side of the excavation.

The dikes will require about 500,000 yards of uncompacted and 170,000 yards of compacted material. Some of the glacial till from the excavation probably will be used in the dikes.

The borrow area, which is about 1,400 feet long and 442 feet wide, is located about 1,300 feet west of the excavation. Nine Cat DW21 scrapers, with pushing assists from Cat tractors, were taking the borrow. The scrapers are at times employed in the lock excavation. Borrow dirt also is hauled in eight Euclid FDT-25 bottom dumps.

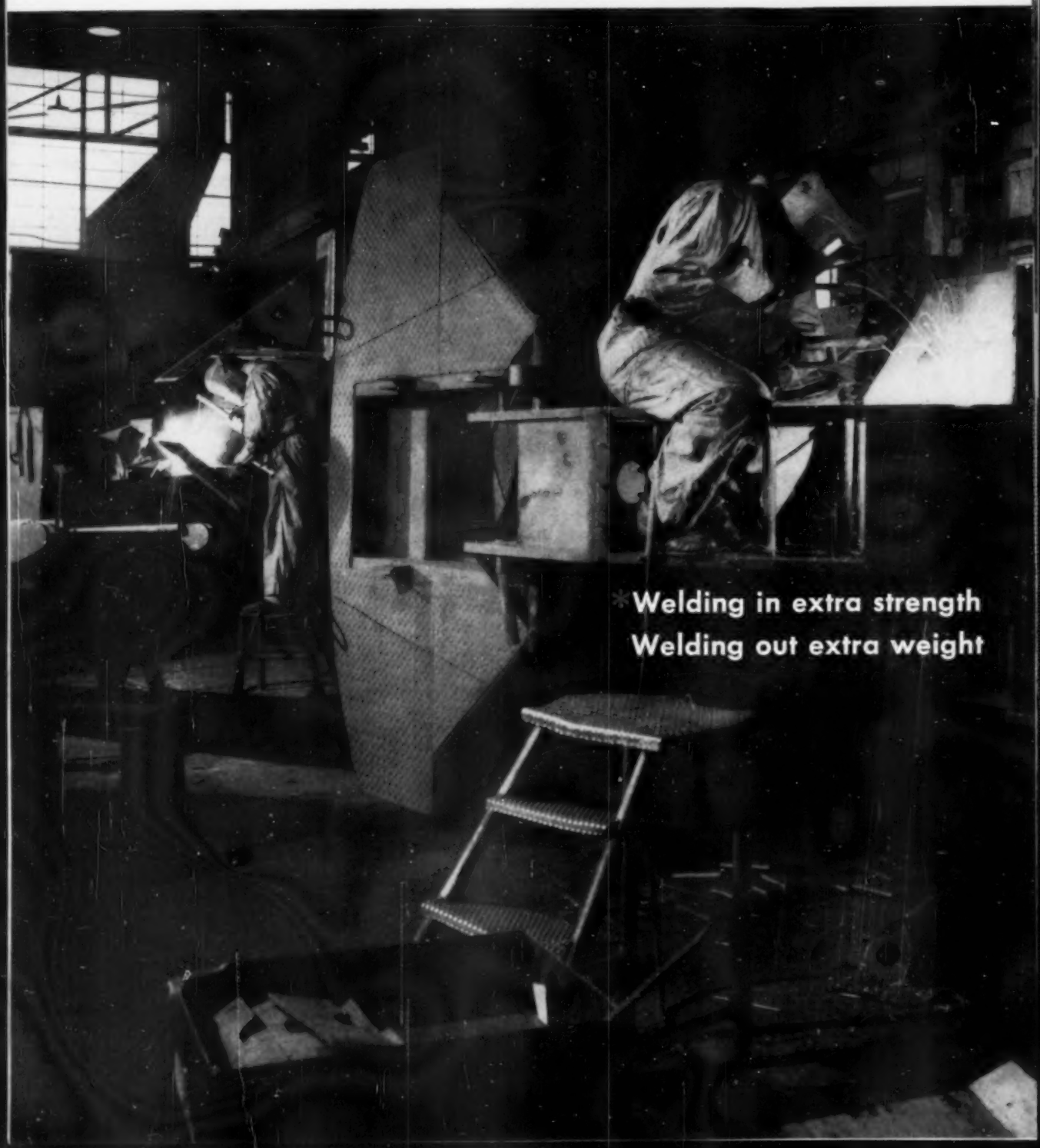
By Oct. 1 the Dutcher Corp. had removed 1,709,000 yards from the lock and had placed 234,000 yards in embankments.

A ¾-yd. Northwest 25 shovel is used

Continued on page 70

A Cat D9 (above) with 20-ft. extended blade arms is able to pile spoil higher. (Below) In borrow area, Cat D8 pushes a Cat DW21 scraper. Borrow is used for dikes.

what puts more guts in



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Welding out extra weight

P&H power shovels ?

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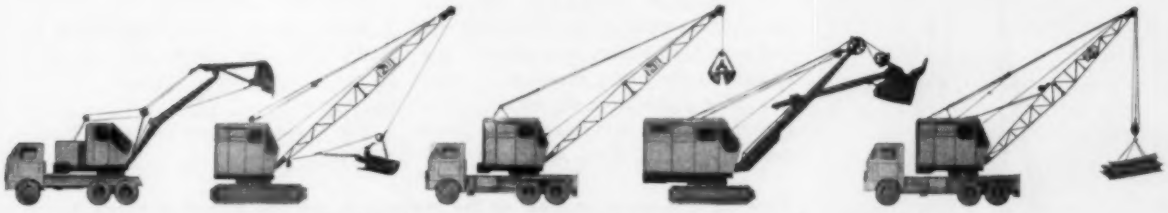
Your P&H dealer will be glad to point out, feature by feature, how P&H puts more guts in power cranes and shovels with all-welded construction. Also, in other ways. Harnischfeger Corporation, Milwaukee 46, Wisconsin.



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IV. Seaway, Power Story:

Two Nations Erecting Large Powerhouse

Behind a striking cofferdam, Canada and the United States each is constructing half of the 3,120-ft. long structure that will result in a few years in the production of 2 million kilowatts.

A LARGE window in the project manager's office affords a striking view of the excavation for the Barnhart Island Powerhouse.

The 60 cells of the 4,200-ft. long cofferdam stretch from Barnhart Island on the American side of the St. Lawrence to a thin strip of land in the Canadian portion of the river.

Down in the excavation, where the cofferdam strikes a visitor as resembling a high prison wall, men and machines methodically continue the labor that in a few years will result in the additional production of 2 million kilowatts from a great river.

Einar Skinnarland, a native Norwegian, is project manager for B. Perini & Sons., Inc., Framingham, Mass., the sponsoring firm of five joint venturers who were awarded the $35,861,955 contract to build the American half of the powerhouse.

The other firms in the joint venture are Walsh Construction Co., New York City; Peter Kiewit Sons' Co., Omaha, Nebr.; Morrison-Knudsen Co., Inc., Boise, Idaho; and Utah Construction Co., San Francisco, Calif.

With some variations, both the Canadian and American Barnhart Powerhouse jobs are the same. The Canadians were scheduled to begin pouring concrete in January; Skinnarland's first pours are scheduled in the spring.

Two workmen observe as a Chicago Pneumatic CP8 diamond drill sinks grout hole.

Cost Nearly Equal

This section will deal only with the work being done on the American half of the powerhouse. The contract for the Canadian half of the structure was awarded to joint venturers for a contract amount of $21,940,253. Equipment and installation contracts will make both sides of the powerhouse about equal in cost.

The Barnhart Powerhouse will be a two-in-one structure 3,120 ft. long. It will span the channel in a straight line at right angles to the direction of water flow. The depth from the intake structure deck to the low point of the draft tubes will be 162 feet. Maximum power head will be 87 feet. Gated openings will admit water to the intake structure.

Each of the 16 turbines—eight Baldwin-Lima-Hamilton and eight Allis-Chalmers—will have a rated capacity of 72,000 hp. The General Electric generators will have a nameplate rating of 57,000 kilowatts, but will be capable of about a 15% overload.

Purchase of the turbine and generator units will be covered by another contract. The joint venturers, however, will be responsible for installation of the turbines. Generators will be installed under another contract. The first unit is scheduled to go on the line on Oct. 1, 1958; the last one is scheduled to be in by December 1959. Also included on the United States side will be three ice sluicers.

The American powerhouse job includes:

Grouting is a major problem on the project. A grouting station is shown below.

St. Lawrence's swift and beautiful water flows past the 4,200-ft. long cofferdam, behind which Canadian and American constructors are building the Barnhart Powerhouse.

1. Excavation of 1,400,000 yards of common and 195,000 yards of rock.

2. Construction of an 8,400-ft. long south forebay dike requiring 1,300,000 yards of earth and 200,000 yards of gravel and rock.

3. Grouting to seal off sedimentary rock layers around the entire perimeter outside the excavation and under the structure.

4. Pouring of approximately 900,000 yards of concrete.

5. Installation of the turbine-generator units.

About 40% of the excavating was completed by Oct. 1, Skinnarland said. He hopes to have all the excavating completed by the end of next summer, which should be the peak of the powerhouse construction with about 1,000 men on the job. The job began on Aug. 3.

50,000 Yards a Week

The excavation, mostly in till and clay, was being done at the rate of about 50,000 yards a week by shovels: a Manitowoc 4500 and three Northwest 80-D's. A rented Koehring crane and another 80-D were doing odd jobs in the pit. The hauling was being done by 17 21-ton Euclids and 10 Macks. Also on the job are six Allis-Chalmers HD-21 dozers and one HD-20 front-end loader.

Whenever possible, dirt from the excavation is placed in the dike. Spoil is dumped in the reservoir area upstream.

Some of the glacial till was blasted loose, using a tenth of a pound of powder per cubic yard. Drill holes were dug by Gardner-Denver Air Tracs and Joy wagon drills.

Prominently placed in the pit is a large elevated dewatering station. The dewatering system includes seven Worthington vertical turbine-type pumps, two each of 40 and 75 hp and three of 150 hp.

Grouting is a major problem. About 500,000 bags of cement might be required to complete the operation; about 60,000 already have been used. The grout will seal off artesian and river water seeping through the strata layers.

Grout Holes Drilled

Twenty-foot spacing was being used in drilling grout holes in October. They may have to drop down to 10-ft. spacing. About 18,000 feet of grout holes had been drilled through September by Chicago Pneumatic CP8 diamond drills. In places it was necessary to drill through 80 feet of overburden. The grout was being pressured into 40 feet of rock.

The project manager hopes to continue excavating through the winter and start pouring concrete on April 1. Drilling in rock will be done with Joy wagon drills.

All aggregate for the 900,000 yards of concrete will be supplied by Tecon-Grafe-Callahan. Work was continuing during the fall on Perini's concrete plant and aggregate handling system. At the height of concrete placing, the plant requirement will be about 240 cubic yards an hour; a peak day's requirement will be about 4,500 yards.

Other Perini officials on the job, in addition to Skinnarland, include: A. J. Ray, administrative assistant; J. L. Fletcher, general superintendent; Ralph Winchell, mechanical superintendent; Henry Meyer, electric superintendent; K. N. Flanagan, rigging superintendent; and Harold F. O'Connell, excavation superintendent.

(Left) A 2½-yd. dragshovel digs behind elevated dewatering station. (Right) A 5½-yd. shovel is guided in for a bite.

COMING UP . . .

the greatest year yet

By even the most conservative predictions, 1956 promises to be the greatest year yet for the construction industries.

This means that there will be even more jobs and bigger jobs to do than ever before. And wherever there's important, demanding hauling to be done, you'll find Macks on the jobs—the *Mack-sized* jobs.

When it comes to moving earth, rock, ready-mix concrete, equipment and building supplies, the construction industry knows there's nothing like Macks. For instance, the economy-champion Mack Thermodyne® Diesel engine, the sure-footed Balanced Bogie with exclusive Mack Power Divider, traditional Mack rugged construction . . . these are among the many Mack features that assure long, trouble-free life at the lowest maintenance costs. You can count on Macks to get more work done—on schedule, and at a profit.

At the beginning of the new year, isn't it a good time to remind yourself again "Can I afford *not* to use Macks?"

MACK TRUCKS **Empire State Building, New York 1, N. Y.**

Cofferdamming of the St. Lawrence to allow first stage construction of Long Sault Dam is clearly defined in this aerial view.

V. Seaway, Power Story:

Simpson Directs Building of Dam

A VETERAN builder of big dams, Elwyn W. Simpson, is project manager for the construction of Long Sault Dam, which is located northeast of Massena. The $25,780,911 arched gravity structure will close the south channel of the St. Lawrence River.

Long Sault Dam and the Barnhart Powerhouse will raise the water level about 90 feet above the bottom of the St. Lawrence.

Simpson is project manager for the Walsh Construction Co., sponsor of the dam job. Joint venturers on the job with Walsh are Perini, Morrison-Knudsen, Kiewit and Utah.

Simpson was associated with famous dams in the West. The latest was Hungry Horse on the Flathead River in Montana. He was general superintendent on that project. Two other recent accomplishments by Simpson include the building of a semi-buoyant bridge in Seattle and the construction of the largest floating drydock in the world.

Long Sault Dam will be 2,960 ft. long, including a spillway section of 1,790 feet. The dam will have 30 fixed-wheel crest gates, each 52 ft. wide. The piers will be 59 ft. wide and 10 ft. thick. Earth embankments will be placed on both ends of the dam to high ground.

Height of the dam from the foundation to the crest of the spillways will be 72 feet; to the top of the piers, 117 feet. The length of the apron, from axis to the toe, will be 272 feet 8 inches.

Two 275-ton gantry cranes will be part of the permanent structure. They will operate on tracks to handle the crest gates. The deck will have a roadway and the gantry track.

The dam will require more than 650,000 cubic yards of concrete, including 500,000 yards in the body. As is the case on all the other Power project jobs requiring concrete, Walsh will mix its own with aggregate supplied by Tecon-Grafe-Callahan.

Construction will be completed in two stages behind cofferdams. The first stage, scheduled to be finished by next August, involves the pouring of concrete to the center line of the 15th monolith.

First stage work has continued since

Veteran builder of Western structures is project manager for the $26 million Long Sault Dam, a 2,960-ft. long arched gravity barrier which will raise the water level of the St. Lawrence.

Two Bucyrus-Erie 54-B shovels excavate and load, while a Northwest crane helps in the erection of an AHD R20 gantry crane.

last spring in an area created by the cofferdamming of the south channel. This 26-cell L-shaped cofferdam, as explained elsewhere in the report, extends from the mainland to Long Sault Island. The smaller upstream cofferdam also crosses from the mainland to Long Sault Island.

Will Remove Cofferdam

The Stage 1 cofferdams will be removed after the completion of Stage 1 operations, and another cellular cofferdam will be constructed from Barnhart Island to Long Sault Island to allow Stage 2 construction. A large rockfill cofferdam from Long Sault Island to the Canadian mainland will extend across the main stream channel for Stage 2 construction.

During Stage 1 work, a small diagonal excavation—Cut C—across the downstream point of Long Sault Island diverts flow around the cofferdam. When Stage 1 is completed, Cut C will be plugged with dumped rock and sealed with impervious fill.

With the cofferdam closing off the north channel during Stage 2 work, the flow will be directed to the south channel through Diversion Cut F, a 6 million yard excavation now being dug diagonally across Long Sault Island by the joint venturers, Kiewit and Morrison-Knudsen.

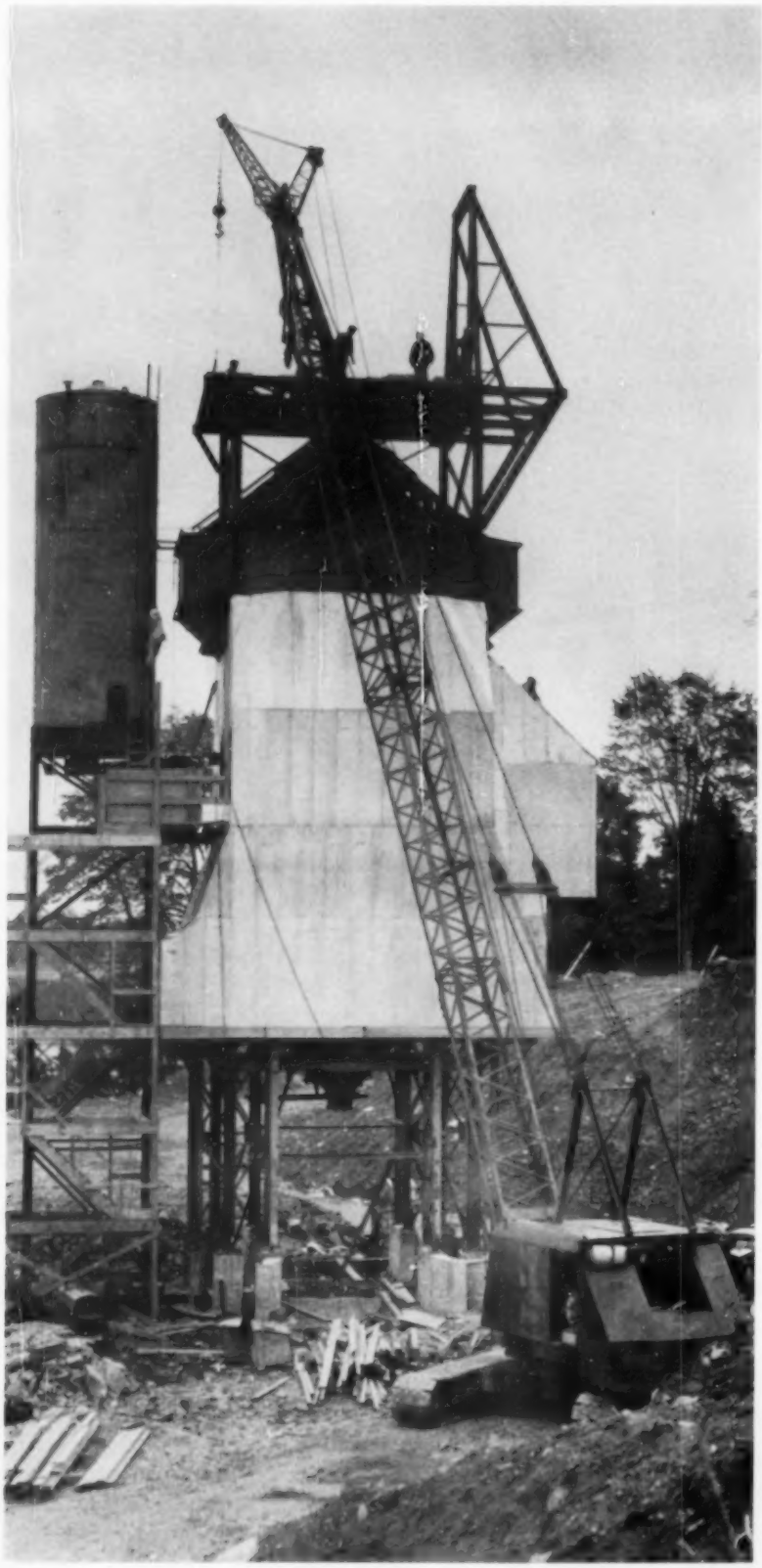
The entire dam is scheduled to be completed by Dec. 30, 1958. Simpson's principal immediate concern, however, is finishing Stage 1 by next August. Approximately 550 men are employed on the job on three eight-hour shifts six days a week.

When we visited Simpson's spread, men were busy down in the deep pit. Shovels were loading out rock. Dozers were cleaning up the area. Men were loading holes for a blast. Engineers were surveying, calculating. Beyond the cofferdam, Long Sault Rapids were boiling.

Excavation Totals

The shovels are excavating from the river bed through 12 feet of sand and gravel and 10 to 20 feet of dolomitic limestone. Excavation in Stage 1, amounting to 65,000 yards of common

One of the 2½-yd. 54-B's swings its load of rock toward a Euclid end dump. First stage excavation will include about 65,000 yards of common, 150,000 yards of rock.



A Manitowoc 3900 crane is used to help erect the 102-ft. high Johnson batch plant. The dam will require more than 650,000 yards of concrete—500,000 yards in the body.

and about 150,000 yards of rock, is scheduled to be completed by next spring. Stage 2 will have about 300,000 yards of excavation.

Simpson had been scheduling two blasts a day. Drilling was being done by nine Gardner-Denver and three Ingersoll-Rand wagon drills. The 2½-in. diameter holes were drilled on 3-ft. centers. The holes were loaded with Hercules powder—a half-pound for each cubic yard of rock.

Two 2½-yd. Bucyrus-Erie 54-B shovels were used to dig and load out the earth and rock. Both are equipped with Cummins diesel engines. One 54-B since has been rigged as a crane. The shovels loaded out to a fleet of Euclid end dumps.

Other Equipment

Other equipment on the spread includes: a Manitowoc 3900 crane carrying a 100-ft. boom; a new Bucyrus-Erie 38-B dragshovel; a Bucyrus-Erie 22-B Transit Crane; a Northwest Model 6 crane; a 20-ton Byers truck crane; four Allis-Chalmers HD-21 bulldozers; and two Caterpillar No. 12 motor patrols.

The grouting job, calling for 60,000 linear feet of grout holes, was subbed to the Selby Drilling Co., Boise, Idaho.

Dewatering of the pit is being accomplished by four pumps, including a 20-in. Fairbanks-Morse and a 16-in. Byron-Jackson.

First concrete was poured into a form for the south wing wall on Oct. 17. Simpson would like to pour all winter, weather permitting. Portland and natural cement — approximately 25% natural—are being used in the concrete mix.

A 102-ft. high Johnson batch plant and an elaborate stacker system were being completed during our visit. The Manitowoc crane helped erect the plant. The batch plant has four 2-yd. mixers. The stacker has a reach of 65 feet and

Walsh's 38-B dragshovel cleans out hole on plant grounds in search of water leak.

travels 410 feet on rails. It has a 30-in. wide belt.

Five materials—cobbles of 6, 3, 1½ and ¾ inches and sand—are carried to the aggregate unloading hopper by a spur railroad. The wash plant has a Tyler F-60 and a Tyler F-800 double-deck rinsing screens.

The concrete will be trucked to the pouring sites in 4-yd. buckets.

One American Hoist & Derrick R20 gantry crane was being erected on the upstream face in October. Two R25 cranes were scheduled to be erected later.

A 25-ton cableway, 1,700 ft. long and extending from Long Sault Island to the Canadian mainland, will be used in cofferdamming the main stream in Stage 2.

Heavy Rock Fill

The job calls for 400,000 yards of heavy rock fill for the cofferdam, which will have a maximum height of about 40 feet. The height of the plug in Cut C will be 38 feet. The contractor will supply most of his own rock fill.

Adequate equipment maintenance facilities are provided on the plant grounds.

Work subcontracted by the joint venturers includes: Walter H. Knapp, Inc., Milwaukee, Wis., railroad spur; Robert E. Foley, plant electric; Buffalo Electric Co., Buffalo, N. Y., permanent electric; Washbourne Construction Co., New York, buildings; and G. & H. Steel Service, Inc., and Bar Steel Construction Co., Drexel Hill, Pa., placing of reinforcing steel.

Simpson's staff includes: George Gavert, general superintendent; S. F. Penna, excavation superintendent; E. C. Little, project engineer; L. E. Leifester, equipment superintendent; W. F. Brooker, carpenter superintendent; R. T. Fralick, rigger superintendent; T. F. O'Leary and L. E. Osborn, electrical superintendents; J. R. Flannery, office manager; and A. L. Schmuhl, safety engineer.

(Above) A stacker with a reach of 65 feet serves the batch plant. It travels 410 feet on rails. (Below) A 20-ton Byers truck crane swings plating in a yard job.

(Above) A 6-yd. electric shovel loads rock to a Euclid at the Iroquois Dam site, east of Ogdensburg, N.Y. (Below) A heavily loaded Euclid powers up a steep hill.

(Below) After cutting into the bank, a second 150-B on the Iroquois job deposits the glacial till into a Euclid. In the background is a 115-ft. high Johnson concrete plant.

VI. Seaway, Power Story:

Iroquois Dam Will Control Level of Lake Ontario

BY March 1, 1958, a 2,400-ft. concrete dam, or control weir, between Rockway Point on the American mainland and the new Iroquois Seaway Lock on the Canadian side of the St. Lawrence River is scheduled to be functioning fully.

The dam, located 25 miles upstream from Long Sault Dam, will control the outflow from Lake Ontario, maintaining its levels between 244 and 248 feet. Lake Ontario's level currently is controlled by the natural rock founded river section extending from Galop Island, about seven miles upstream to the Iroquois Dam site.

Peter Kiewit Sons' Co., Omaha, Nebr., is sponsoring construction of the $13,836,018 international dam in joint venture with The Arthur A. Johnson Corp. and the Al Johnson Construction Co.

32 Upright Piers

A buttressed gravity structure, the dam will have gate-controlled sluiceway openings. The 32 upright piers will be on 60-ft. centers. The piers will contain two slots, one for 50-ft. steel gates and the other for stop logs. The distance from the sill to the top of the pier will be 62 feet.

The structure will require 170,000 cubic yards of concrete, all of which will be manufactured on the grounds with aggregate supplied by Tecon-Grafe-Callahan. Rolled earthfill wing dams will close the valley on the American side of the river.

Harry Sall, young (37) and bespectacled, is the Kiewit project manager. Iroquois Dam will be built in two stages. First stage construction, which started

Buttressed gravity structure is being built 25 miles upstream from Long Sault Dam site.

(Left) A 2½-yd. shovel digs another haul road into the excavation. (Right) A Euclid dumps its load into the finger dike.

last July and must be completed by next July, involves construction of 16 piers inside the first stage cofferdam.

Present plans are to build a steel sheet pile cellular cofferdam across the river to start the second stage of the project. The second stage cofferdam will involve the construction of 40 64-ft. diameter cells with sheets ranging from 46 to 53 ft. long.

The entire job will involve excavation of about 4 million yards, including 2.7 million yards on Rockway Point and the rest currently underwater.

By the end of September, about 550,000 yards — 40,000 yards of it were rock — had been taken from the excavation. The majority of the excavating was being handled by two 6-yd. Bucyrus-Erie 150-B electric shovels and a Northwest 80-D. Another 80-D was assigned to general excavation. The 150-B's were brought to Iroquois from the Minnesota iron range.

The pit already was 8 to 10 inches below final grade. The added depth provided a better natural grade.

Trucking most of the dirt to a spoil area on a nearby farm were 11 Euclid end dumps and 15 Euclid bottom dumps.

Heavy rain had fallen the night before we visited the Iroquois location. The excavation was extremely muddy. Work continued at full tilt, however. One of the 150-B's was loading out rock; the other was digging glacial till from a hillside. One of the 80-D's was opening another haul road to the rear of the excavation. Some of this dirt was being dumped into finger dikes that eventually would enclose parts of the underwater excavation areas.

Prepare for Blast

Preparations were being made to blast the rock. The 2⅞-in. diameter blast holes were being drilled by eight Gardner-Denver wagon drills, powered by Ingersoll-Rand stationary compressors.

A Manitowoc 4500 dragline had started to cut away the upstream side of Rockway Point, where the flow will be diverted for the second stage of the project.

Two other Manitowoc machines are on the job. A 4500 crane will be used as a pile driver and to pour concrete. A Model 3900 was assigned to concrete-pouring duties. Seven Caterpillar D8's drew the cleanup assignment.

Concrete placement started in November and was to continue until the weather became too severe for such work. A 115-ft. high Johnson concrete plant, capable of producing 150 cubic yards an hour, was erected on the grounds.

An aggregate storage area, divided into five bins with a total capacity of 45,000 tons, feeds the concrete plant. The aggregate is trucked to the property from Norwood. A large inventory will be necessary because spring thaws will keep aggregate trucks off the highways for a while.

A 275-ft. long Armco reclaiming tunnel serves the aggregate bins. A 250-ft. long Goodyear conveyor transports the aggregate to the plant. Universal and Alpha cement are used.

Internationals Carry Concrete

International trucks will carry the concrete from the plant to the site of the pours in 4-yd. buckets. The Manitowocs will handle the pouring.

Two gantry cranes will be erected by the contractors as part of the permanent structure. Kiewit subbed the permanent electrical work and some of the hauling. Upstate Trucking Co. is hauling the aggregate from Norwood. Gens-Massachusetts Electric-International, Inc., is the electrical subcontractor.

It is planned to continue the excavation work throughout the winter. About 425 men were on the payroll in the fall. The working force probably will be increased to 500 men at the peak of activity next summer.

Personnel

Key Kiewit personnel on the job, in addition to Sall, include: Everett Eyden, project engineer; C. J. Metcalf, structural and pile driver superintendent; Ed Pearson, excavation superintendent; Harry Poppaw, equipment manager; and Roger Caldow, electrical superintendent.

Cutting away the upstream side of Rockway Point, where the flow of the St. Lawrence will be diverted for the second stage of the project, is a Manitowoc 4500 dragline.

VII. Seaway, Power Story:

Intake Will Insure Village Water Supply

$7.8 million project will serve Massena and provide a supply of power for aluminum plant.

DURING construction activity on the Seaway and Power projects, the village of Massena's 17,000 residents must be assured of an adequate supply of drinking water. Alcoa's big aluminum processing plant must be assured of a steady supply of power during the construction period.

To insure the water and power supplies, a structure called the Massena Intake is being constructed under a $7,780,157 Power Authority contract by the joint venturers, Morrison-Knudsen (sponsor), Perini, Walsh and Utah.

The job, which was awarded last summer, will involve 2,400,000 yards of excavation, 800,000 yards of fill for dike embankments and the pouring of 180,000 yards of concrete in a 692-ft. long gravity concrete dam.

The intake will have a maximum height of 110 feet from foundation to the deck; 125 feet from the foundation to the top of the control house structure. Its base width will be 81 feet.

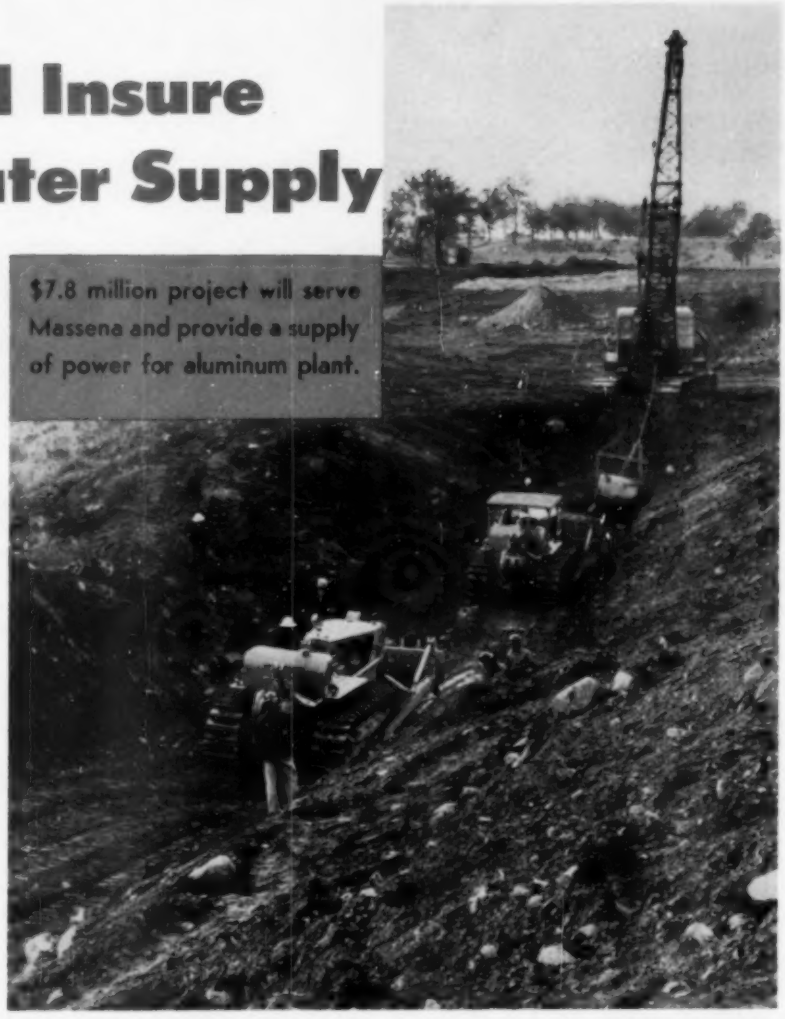
119-ft. Intake Section

The structure will have 183-ft. and 315-ft. bulkhead sections on the west and east, respectively, a 119-ft. intake section containing four pairs of gates and a 75-ft. control house section. Retaining walls will be built on both sides of the structure, extending 235 feet on the upstream side and 158 feet downstream.

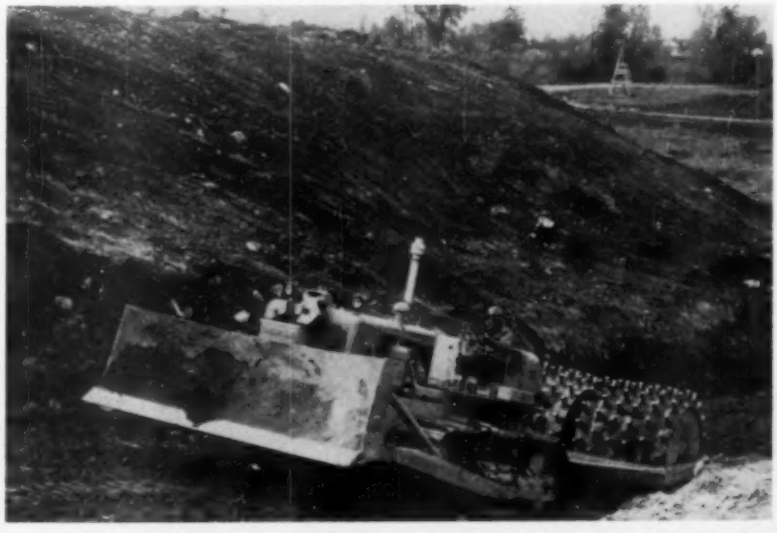
To furnish potable water during periods of unavoidable turbidity in the canal during construction, a temporary intake consisting of a 60-in. nominal size pipeline starting at a crib intake about 800 feet upstream of the intake structure, together with a pump room and a permanent pipeline continuing downstream, will be provided. The control house section will house a 48-in. diameter pipe flushing system to prevent stagnation of the water in the canal after the four sluices are no longer required.

When the power canal is abandoned for power purposes, Alcoa will receive its power from the Barnhart Island Powerhouse.

H. S. Booth, M-K's project manager



A P&H dragline excavates a core trench on the Massena Intake job. Caterpillar bulldozers spread backfill, which was dumped by Euclids. Job will cost $7.8 million.



Compaction of backfill in the core trench is provided by a sheepsfoot roller, being pulled here by a Cat D8. Project will assure Massena of an adequate water supply.

(Left) Glacial till is loaded from a 2½-yd. shovel into an end dump truck. (Right) Another load of till slides out of a Euc.

on the intake job, was completing preliminaries in early October. Plant facilities were not yet completed when *Excavating Engineer* visited the job. Additional equipment was on the way. The working area around the shop and warehouse had been graded. Preparations were being made to move the office to the jobsite from a farmhouse about a mile away.

A 5½-yd. Manitowoc 4500 diesel-powered shovel and a 2½-yd. Northwest 80-D shovel had started to excavate the glacial till. They had moved about 100,000 yards. Another Manitowoc 4500 was to be sent into the excavation.

Haul to Stockpile

The excavation, which will be about 100-ft. deep, will extend about 1,600 feet along the Massena Power canal and about 900 feet east and west.

Selected portions of the excavated till are being hauled to a controlled stockpile, to be used later as backfill along the west bulkhead and to complete the 3,000-ft. long dike.

The spoil will be placed in a field which later will be inundated. Some dirt was used to level the office and warehouse areas.

Available on the east bank of the canal is material which will be used for fill on the east bulkhead and as borrow for the dike.

Construction of a drainage diversion ditch will involve 135,000 yards of excavation.

A dozen 17-yd. Euclid end dumps were hauling the dirt. Also at work were four Cat D8's and a Cat motor grader and a Cat sheepsfoot roller.

A P&H dragline was excavating a core trench, which was being backfilled by Euclids. The D8's spread the backfill, which later was compacted by the sheepsfoot roller.

Yard work is handled by a P&H truck crane.

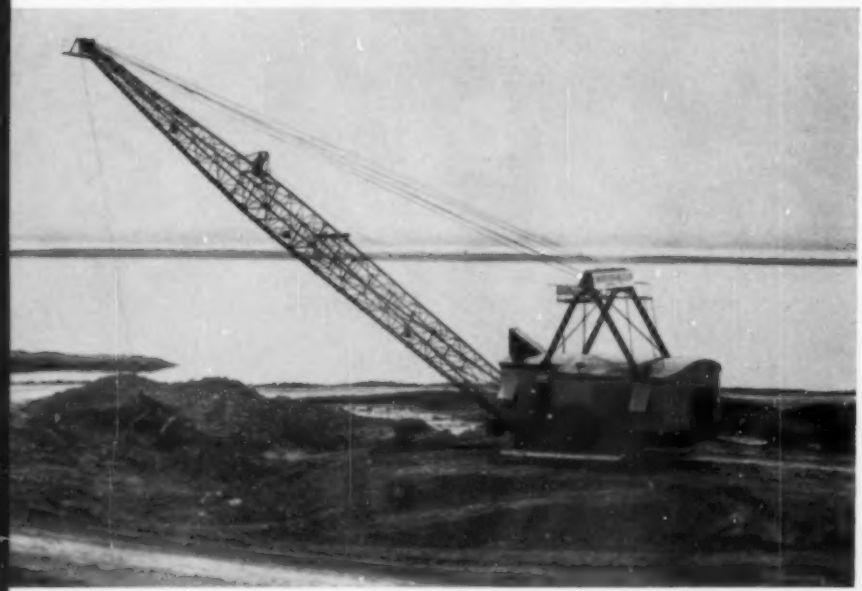
Concrete pouring is expected to start in the spring. Tecon-Grafe-Callahan will supply the aggregate for the concrete plant to be erected on the jobsite.

Three Shifts Working

Between 120 and 150 men are working three eight-hour shifts. Winter work was to be devoted largely to hauling to waste piles.

Marty Dyke is Booth's project engineer; Jack R. Gage, office manager; Owen J. Daly, excavation superintendent; Don Herman, equipment manager.

A Cat motor grader works on a road. The flat surface in the foreground is a controlled stockpile of excavated till which later will be used as bulkhead backfill.



Three of the machines used on the Red Mills job were a Manitowoc 4500 dragline (top), a 5-yd. 120-B electric shovel (center) and a 6-yd. 200-W walking dragline.

VIII. Seaway, Power Story:

Channel Ur

MORRISON-KNUDSEN Co., Inc., was awarded the first major contract by the Power Authority for improvements on the St. Lawrence River channel.

A $5,900,442 contract for what is called the Galop Island South Channel improvement will involve excavation of approximately 5,850,000 yards of common and 497,000 yards of rock.

The job, located a short distance east of Ogdensburg and 11 miles west of the Iroquois dam site, embraces 900,000 yards of excavation from the mainland at Red Mills Point, deepening the channel between the mainland and Lalone and Lotus islands and cuts on Galop, Lalone and Lotus islands. Much underwater excavation will be involved, but Project Manager Jack Binder will take as much as possible in the dry.

The job is scheduled for completion by next July 1; to get the job done, two 10-hour shifts are being main-

Big machines called in for job requiring the excavation of 6.3 million yards of material.

...dergoes a Face-Lifting

Swinging a 15-yd. bucket from a 200-ft. boom, a Bucyrus-Erie 450-W walking dragline drops another load of dirt on a dike it is building from mainland to Lalone Island.

A Gardner-Denver wagon drill puts down a blast hole in quarry on M-K job site.

tained six days a week. About 400 men are on the payroll.

The Red Mills Point phase of the operation was scheduled to be finished in a hurry. *Excavating Engineer* visited the job on a wet, gray October day. Some 400,000 yards already had been taken from the point in two months.

The area to be excavated was 2,200 ft. long at the toe. The distance from toe to point was 550 feet. Most of the excavated material was sand and gravel, with some clay and a little glacial till. All the excavated material was to be spoiled to the rear of the pit.

Machines Attack Dirt

The dirt was being attacked by a 6-yd. Bucyrus-Erie 200-W walking dragline, a 5-yd. Manitowoc 4500 dragline, a 2½-yd. Northwest 95 dragline and a 5-yd. Bucyrus-Erie 120-B electric shovel.

Also active were three 18-yd. Euclid S-18 scrapers, three Caterpillar D8's and three D9's and a Cat motor patrol. Eight Euclid end dumps of 17 and 23 yards capacity and four rented 10-yd. Macks did the hauling.

The dewatering was being accomplished with 10-in. Marlow diesel pumps. A Caterpillar D13000 engine generated electricity.

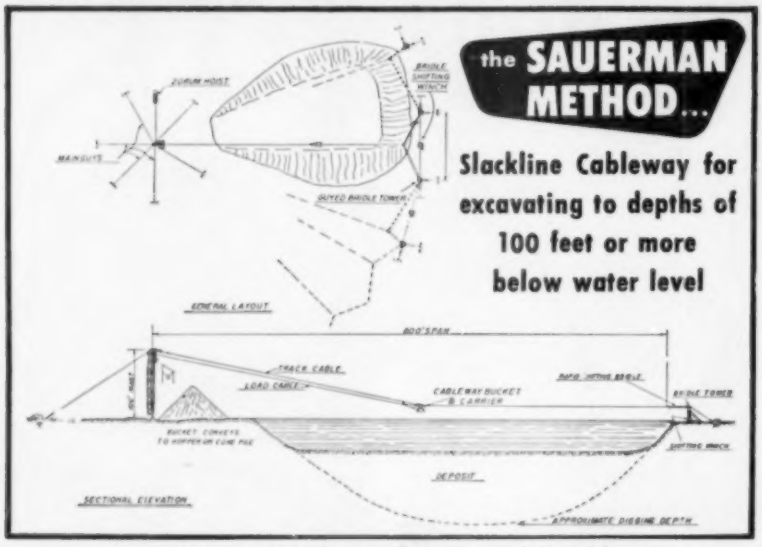
Leaving Red Mills Point, we headed east. Soon, opposite Lalone and Lotus islands, we saw a big Bucyrus-Erie 450-W walking dragline, a 15-yd. bucket swinging from its 200 ft. boom, carrying out its busy and impressive chores. (The 15-yd. bucket was later to have been replaced with one of 13 yards.)

The 450-W, powered by a Cooper-Bessemer diesel, was digging in the mainland and dropping its big loads on a dike it was constructing in the river. The dike eventually would stretch from the mainland to Lalone Island. This

Continued on page 70

One of three Euclid S-18 scrapers at Red Mills gets a push from a Cat D9. The Galop job includes excavation of about 5.8 million yards of common, 500,000 yards of rock.

HOW TO DO A BETTER UNDERWATER EXCAVATING JOB



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.

Cableway at Cabinet Gorge Dam digs and hauls from tailrace 1000 ft. away. **(Full details in Sauerman News No. 143.)**

New York gravel producer switched to cableway for underwater operation of his pit. Average haul is 600 ft. from a 50-ft. depth **(Sauerman News No. 141).**

You can remove more underwater material with a long reaching Sauerman Slackline Cableway. On job after job this machine has proved to be the most efficient for this type of operation. It is especially effective where the material to be excavated has good depth and will flow to the bottom of the cut. For shallow deposits or non-caving material a rapid shifting device is used to change the line of operation.

One man controlling the hoist digs, conveys and elevates from deposit to plant over spans of 1000 ft. or more . . . across streams, lakes, bogs or deep pits. The powerful load line pull insures digging penetration. Tensioning the track cable lifts the bucket which is inhauled at high speed and dumps automatically. Gravity return completes the fast operating cycle. Bucket capacities range from ⅓ to 3½ cu. yds.

To get fast, economical long range excavation, and the shortest, most direct way from pit to pile use a slackline cableway. Contact Sauerman for specific recommendations. No obligation. Request Catalog C, showing detailed specifications and photos of slackline cableways in action on all types of deep digging jobs.

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Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

News from the Field

Record Year Foreseen

Expenditures for new construction in 1956 in the United States may reach a record-breaking total of $44 billion, the Commerce and Labor departments have estimated in a joint report. This would represent a 5% increase over the $42 billion activity indicated for 1955.

Large gains are anticipated for 1956 in private nonresidential and public construction. The report expected new housing to continue at a high level, although slightly below the 1955 volume.

The 1956 estimates are based on the assumption of a moderate increase in overall economic activity and also on a heavy volume of construction in progress at the end of 1955 and carried into the new year.

Estimated private construction outlays in 1956 are expected to total more than $30 billion. Public construction expenditures are expected to total more than $13 billion. Both figures represent an increase.

Kansas Turnpike Progressing

Construction work on the 236-mile Kansas Turnpike was 21.7% complete late in November, the Kansas Turnpike Authority announced. Design work was 97.4% complete.

Barring unanticipated delays, the super highway is expected to open on schedule next October, Gale Moss, Turnpike general manager, announced.

Design projects still in progress include service areas, division maintenance buildings and administration area.

Contracts awarded through Nov. 1 totaled $97,515,000. Left to be awarded were contracts for projects estimated to cost under $5 million overall.

The November report showed 232.3 miles of right of way available; 236 miles of grading under contract and 231 miles of grading under construction. All 253 Turnpike bridges are under contract; construction has begun on 244 structures.

First concrete paving on the Turn-

Continued on page 60

D Tournapull Rear-Dump's ability to turn around in only 24'8" enables it to spot fast in tight quarters. With 10 to 11 passes of ¾-yard shovel, unit loads 8 pay yards in about 3 minutes. Big 10'11" x 5'10½" bowl opening, with low rear entry, makes loading easy.

Hauling from pit to crusher, "D's" average 900' distance in 1½ minutes... returning in about 55 seconds. Units' 4-wheel multiple-disc air-brakes assure positive control at all times... give operators complete confidence on winding roads and steep grades.

"Better than trucks where going is tough"

says Superintendent R. E. Merritt of Oregon's Jackson County

To speed delivery of rock from quarry to crusher, Jackson County Highway Dept. teamed up 2 D Rear-Dumps to handle all crusher requirements.

On the job the "D's" encountered tight loading quarters, rough quarry terrain and underfooting, and adverse grades on haul roads. Unit's speed and maneuverability, plus ease in spotting in restricted places, helped keep crusher well supplied with rock at all times.

1800' cycle in 9¾ minutes

When pictures were taken, the 11-ton "D's" had already moved 28,000 yards of rock to the crusher. Time studies showed that each "D" was averaging 8 pay yds. per load... 1800' cycles were completed in about 9¾ minutes, including 3.65 min. to load and a 3.95 minute waiting time.

"Work in closer quarters"

Comparing the operation of the Rear-Dumps to trucks, Supt. Ralph E. Merritt said, "The D Rear-Dumps are a lot better than trucks where the going is tough." Operator Floyd Sherman added, "'D's' can get around in a lot closer quarters, too."

Safer than trucks

Besides being faster and more maneuverable than ordinary trucks on rough roads, D Rear-Dumps are also safer when dumping loads. Front-wheel-drive on "D's" keeps power and traction on solid footing well ahead of rear wheels. Because body does not need to clear frame, springs, axle, or differential, its center of gravity stays low, even during dumping. Over-size multi-disc air brakes — with more braking surface on one wheel than comparable-size trucks have on all four — prevent creeping or rolling, especially when dumping.

If you have a tough hauling job... better check D Rear-Dump's advantages for yourself. See how the 11-ton "D", 22-ton "C" or new 35-ton "B" can help you.

Tournapull—Trademark Reg. U.S. Pat. Off. DR-903-P-b

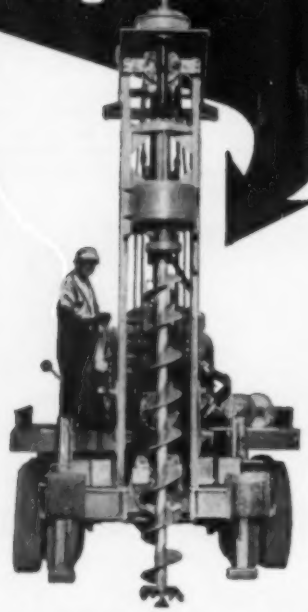
At crusher, "D" dumps 8-pay-yard load in 20 seconds. Operator Floyd Sherman said, "You can get around in a lot closer quarters with 'D's' than you can with a truck." He added, "These D Rear-Dumps are not as hard on the operator as many other types of haulers."

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

World's heavy auger | fastest, vertical drill



NEW HEAVY-DUTY McCARTHY drills 8-inch holes 100 feet deep in sandrock in 40 minutes *

* Ohio River Colliery Co., Cheshire, Ohio

This new heavy-duty drill, Model 106-24, is used for blast hole drilling, general exploration, foundation drilling, dewatering operations, deep post holes, etc. Has high-speed power take-off for small diameter augers, and low-speed power take-off (3 to 1 reduction) for large diameter augers. Hydraulically operated throttle valve.

AUGER DIAMETER		DEPTH OF BORE
20 INCHES		30 FEET
16 "		40-60 "
12 "		60-80 "
8 "	and under	100 "

8" and 9" diameter augers bore through shale and sandrock to produce larger diameter holes for new type explosives. Larger diameter augers bore through shale and hardpan formations. The choice of contractors where the going is tough.

For complete information contact The Salem Tool Co.
Ask for Bulletin M-100

THE SALEM TOOL CO.
S. ELLSWORTH AVE.
SALEM, OHIO · U. S. A.

Chicago's $12,700,000 filtration system project was begun during the fall. Mayor Richard S. Daley, shown at the controls of the crane, officially started the project.

News . . .

Continued from page 58

pike was started in October in Douglas County. Fine grading and placing base courses also was started by paving contractors in Sumner and Lyon counties in the flexible or asphaltic concrete section of the Turnpike.

Full scale paving operations will be resumed next spring. Of the 72 success-

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Stuart A. Wade

Stuart Wade, executive vice president of the H. O. Penn Machinery Co., Inc., Bronx, N. Y., died at his home, 2 Fifth Ave., New York City, the night of Nov. 5. Death was attributed to a heart attack.

Mr. Wade joined the Penn Co. in 1936. Upon the death of Hamilton O. Penn in 1946, the business was purchased by Mr. Wade and Ralph L. Johnson. The business since has expanded rapidly.

The main office and warehouse are located at 140th St. and the East River. Branches are at Westbury, Poughkeepsie and Tuxedo Park, N. Y., and Newington, Conn. The firm distributes and services Caterpillar products, Bucyrus-Erie shovels and other construction equipment.

Mr. Wade was a member of the Hartford Club, Circus Saints and Sinners and the Moles. He is survived by his wife Charlotte; a son, Peter H., of Chappaqua, N. Y.; and a daughter, Mrs. Margaret W. Welch, Simsbury, Conn.

Burial was at Evansville, Ind.

Only the new B Tournapull

can give YOU all these advantages

Greater capacity

Accurately rated capacity by SAE standards of 18 cu. yds., struck, or 24 cu. yds., heaped, makes the "B" an outstanding machine for the big yardage jobs.

10-gear speed selection

Ten speeds, plus clutch-brake for fast shifting, means you can haul at higher speeds, complete more haul cycles per hour. Double-clutching and gear clash are eliminated. Low-gear speeds aid in loading, and make it easier to climb grades.

Faster, easier loading

Welded box-beams and channel construction increase bowl strength to withstand stresses of fast loading. New push-block provides direct-line thrust to cutting edge. New scraper hoist-control gives fast pumping action in loose materials. New deflector plate piles heaping loads. Blade angle, improved weight distribution speed loading.

Longer tire life

"B's" 27.00 x 33, 30-ply tires provide ample safety margins. Rated to carry more than capacity loads, they don't overheat, don't wear as do overloaded tires on most self-propelled scrapers of this size.

Power where it's needed

Tournapull's electrical system puts the power right where it's needed with minimum friction loss. Dependable motors, never affected by weather, are operated by dashboard push-buttons. Action is instantaneous. Maintenance is simple.

Shorter turns

"B" maneuvers in closer quarters than any other big self-propelled scraper, turns around non-stop in a space only 35′ wide. With "feather-touch" power-steer, operator controls this rig with no effort . . . maneuvers easily, safely, at high speed.

Less weather delay

Because of "B's" high tractive ability, you start work earlier . . . stop less often due to bad weather . . . add more productive time at end of season. Big, low-pressure tires give good traction in soft going. Differential automatically transfers power to match traction, minimizes wheel slippage. Electric system works accurately and dependably in heat or cold, rain or snow.

Safe, easy operation

Operator rides comfortably on soft, foam-rubber cushioned seat. Pneumatic tires relieve stress and strain on man and machine. Fingertip electric controls work fast, sure, give less end-of-shift fatigue. Good visibility, low center of gravity, big disc-type brakes make Tournapull exceptionally safe to operate.

Interchangeable equipment

Same B Tournapull prime-mover powers an interchangeable 35-ton rear-dump hauler. You get double value from your investment by keeping your 2-wheel tractor working either with shovel rock or scraper dirt. Changeover, using same wheels, brakes, and electric controls, takes only a few hours.

Prototypes of the "B" were put through rugged tests on our new proving grounds. They were then tested on the job by leading contractors, under rugged field conditions. The result is a fully-proved machine. The new LeTourneau-Westinghouse Company backs the new "B" and every component in it.

Tournapull—Trademark Reg. U.S. Pat. Off. BP-883-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

News . . .

Continued from page 60

ful bidders for construction work on the Turnpike, 31 are from the state of Kansas itself.

Chicago Project Starts

Work was begun during the fall months on Chicago's new $12,700,000 water filtration system. All six shafts in the tunneling, which will be on a six-mile line extending roughly from Wilson Avenue on the north to the proposed filtration plant at Navy Pier, will be sunk by Harry A. Thompson & Co. of Chicago.

The shafts will be 20x40 ft. in area and 60 feet deep at the outset. The final depth of the central shaft at Belmont Harbor will be 251 feet. Tunneling will proceed north and south from the bottom of the Belmont Harbor shaft.

The shafts will be of 60-ft. steel beam sheathing, which will be joined into one large assembly and driven into the ground as a unit.

Thompson & Co. was awarded a subcontract for the shaft work. The main tunneling contract was awarded to the following joint venturers: Grafe-Callahan Co., Los Angeles, Calif., and Dallas, Tex.; Tecon Co., Dallas; Mittry Construction Co., Los Angeles; and Johnson, Drake and Piper Co., New York.

Sensibar Tells Story

J. R. Sensibar, president of Construction Aggregates Corp., told a Chicago television audience last fall how Chicago's lakefront came into being.

Sensibar, a guest on the "This Is the Midwest" program is the man who devised the hydraulic method of piping sand to the required areas to make the lakefront development project economically possible.

Equipment You Ought to Know About

Heavy-Duty Grader

Manufacturer: Allis-Chalmers Mfg. Co., Tractor Group, Milwaukee, Wis.

Claims: Allis-Chalmers has introduced the Forty-Five motor grader, a new heavy-duty unit powered by the new A-C ADS-516 six-cylinder, four-cycle diesel engine with its rated 120 maximum brake hp at 1,600 rpm.

The Forty-Five weighs 23,800 pounds of which two-thirds (17,375 pounds) is on the tandem drive rear wheels. On the front wheels are 6,425 pounds. Blade pressure is 10,950 pounds.

The engine in the Forty-Five has a $4\frac{7}{16}$ in. bore and $5\frac{9}{16}$ in. stroke with a 516-cu. in. piston displacement. It delivers power for forward speeds up to 20.6 mph and up to 7 mph in reverse; the grader can be throttled down, under governor control, to one-half these rated speeds without loss of rim pull.

Incorporated in the Forty-Five is an exclusive finger-tip control box. Toggle-type linkage affords increased leverage for operation of moldboard, wheel lean and scarifier.

Among other basic design features of the Forty-Five are the combination mechanical and hydraulic power steering; self-energizing brakes aided by a two-stage master cylinder; conveniently located engine and transmission controls; accelerator-decelerator pedal that permits engine speeds to be increased or decreased without change of hand throttle setting; new double-disc master clutch with ceramic lining that provides smoother clutch action and longer life; self-aligning outboard bearings in the final drive where heavy roller chains running in full oil bath transmit power to the four tandem wheels; double universal joint drive shaft providing self-

Continued on page 64

SCOOP UP THE PROFITS!
A more efficient dragline bucket means bigger profits for you. Omaha Dragline Buckets eliminate unnecessary weight . . . make room for a bigger payload. Remember the name . . . Omaha . . . for dependable, efficient dragline buckets. Send for complete catalog giving description and specifications of four types.
OMAHA
DRAGLINE BUCKETS
DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.

100 miles per day

OPENED 40 YEARS AGO, THE QUARRY NOW PRODUCES 15,000 TONS OF MATERIAL DAILY

Most is put through large primary crusher on the following schedule:

DAY SHIFT

1. Limestone: bulk of tonnage shipped by rail.
2. Undersize stone: part made into agricultural lime; balance used for commercial stone.

NIGHT SHIFTS

3. Commercial stone: sold locally for highway and concrete work.
4. Sand: sold locally for highway and concrete work.
5. Rip-rap stone: supplied primarily to railroads.
6. Removal of overburden varying from 6 inches to 40 feet in depth. About half is stone suitable for local sales; the rest, low-quality stone and dirt, is dumped into worked-out sections of quarry.

for general clean-up tractor at large Eastern quarry

Thousands of tons of limestone and overburden are removed daily from this Eastern pit, one of the largest quarries in the country. Recently, to speed clean-up on the 300-acre spread, the quarry owner replaced a crawler-tractor with a 186 hp rubber-tired Tournatractor.

This 19 mph unit proved so successful, it now works 3 eight-hour shifts daily, 5 days per week. Each day, it travels more than 100 miles around the pit to do its work — 40 to 45 miles on the day shift, 30 to 35 miles on each of the two night shifts.

All-purpose tool

Its major assignment on all shifts is to clean up for 2 shovels, located 1½ miles apart, and to maintain 2 overburden dumps. Traveling job-to-job at speeds to 19 mph, it usually makes 4 trips per shift to each of the shovels and 4 trips to each of the dumps. In addition to these 16 trips and 16 clean-up periods per shift, the versatile unit still finds time to do odd-lot tasks. Five or six times a day, it cleans up around the crusher. During travel between shovels and dumps, it helps a motor grader clean rock spillage from the haul roads.

Instant-shift, constant-mesh transmission enables this highly mobile unit to doze in and back away in a hurry, without delay to shovel. Torque converter eliminates jolting gear changes.

Despite its greater speed, men on the job report Tournatractor has been far less costly to maintain than track-type tractors. In 9 months of round-the-clock routine, the machine has been shut down only 3 times for minor repairs, not at all for major repairs.

"Tournatractor has done a good job — especially on shovel clean-up," says the assistant quarry supt.

"I like the rubber tires," adds the Tournatractor operator. "They get you to a job faster, and help you do the work faster. The fine seat makes work a lot easier, too."

If your work involves abrasive materials, or jobs scattered around a large area, it will pay you to investigate Tournatractor. Ask for a demonstration!

Tournatractor—Trademark Reg. U.S. Pat. Off. T-620-Q-bw

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

New Equipment . . .

Continued from page 62

alignment between engine and transmission; needle-bearing universal joints grease-packed for life; full revolving, completely welded and machined circle; 24-volt electric starting system; Allis-Chalmers exclusive roll-away moldboard with involute curve that reduces friction drag by rolling the load up and ahead of the blade; and unit construction for easy service accessibility.

"Box seat" visibility gives the operator, whether he sits or stands, full view of the job being done. The main frame has no cross braces or supporting members to impede vision. Platform edges are tapered toward the front, permitting the operator to see both ends of the blade. The steering wheel is adjustable to the height of the operator. The adjustable foam-rubber operator seat is covered with weather resistant plastic.

In addition to power steering, hydraulic brakes for the tandem wheels, mechanical parking brake, leaning front-wheel axle and other standard equipment, much special equipment is available for the Forty-Five, including 10 and 14-ft. moldboards; a hydraulic shiftable moldboard; blade extensions; bulldozer; scarifier with a maximum pressure of 9,200 pounds; hydraulic brakes on forward tandem wheels to provide brakes for all four tandem wheels; heavy-duty filters; cab; cab heater; full length one-piece windshield; windshield wiper; defroster; fan; rear floodlight; power tire pump; special tire equipment; hour meter; and adometer.

..because they went to their doctors in time

Many thousands of Americans are being cured of cancer every year. More and more people are going to their doctors *in time.*

But the tragic fact, our doctors tell us, is that every third cancer death is a needless death... *twice* as many could be saved.

For the facts of *life* about cancer, call the American Cancer Society office nearest you or write to "Cancer" in care of your local Post Office.

American Cancer Society

Heavy-Duty Macks

Manufacturer: Mack Trucks, Inc., 350 Fifth Ave., New York, N. Y.

Claims: The production of the B-80 line of trucks, especially designed for heavy construction and other rigorous duties, has been announced by Mack.

The new series includes 11 models, all with square-cut military front fenders and bumpers.

They have large section heat-treated alloy steel frames which are double-channeled from end to end. Heavy fishplating is available where required on long wheelbases. All have exposed radiators with bolted top and bottom tanks and flat-top fenders which can be used as working platforms.

Features of the B-80 include:

A choice of gasoline or diesel engines ranging from 170 to 300 hp, including the new Mack Thermodyne turbocharged diesel with a 205-hp rating.

A broad choice of wheelbases and gear ratios is available.

Four-wheelers are provided with a massive dual reduction rear axle with radius rods and torque rods. The six-wheelers use large-capacity Mack balanced bogies in two sizes. The Mack power-divider-type inter-axle differential is used in the six-wheelers.

The four-wheel models have gross vehicle weight ratings of 46,000 pounds; the six-wheelers are listed at 55,000 and 65,000 pounds, respectively, depending on the size of the bogie used. Bogies are available on this series.

Cat D4 Oil Clutch

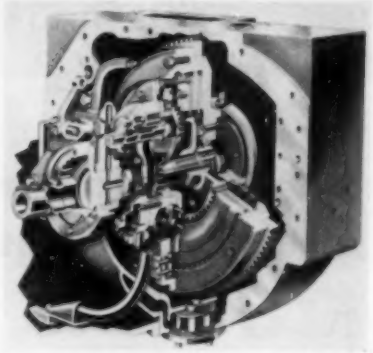
Manufacturer: Caterpillar Tractor Co., Peoria, Ill.

Claims: A new oil clutch, available as an attachment for D4 tractors has been announced by Caterpillar.

The D4 oil clutch is similar in design to the oil clutches in the D6, D7, D8 and D9 tractors. It features metallic-faced clutch discs, a self-contained gear-type pump and oil supply clutch brake for easy gear shifting.

The three metallic-faced plates on the D4 oil clutch are always separated by oil films, except for the last revolution or two as the clutch is engaged. The oil system includes an oil pump with screened inlet and passages which carry oil to all parts of the clutch.

Oil enters the inner diameter of the clutch plates and circulates between



them by means of grooves in the clutch facings. The oil carries away heat and reduces wear. Clutch adjustment, while easily made, is seldom required. Plate replacements should be as infrequent as engine overhaul under normal conditions, Caterpillar says.

The oil clutch is especially desirable in bulldozing work and other jobs where frequent engagement, disengagement and slipping of the flywheel clutch are necessary.

Tire Changing Tool

Manufacturer: Goodyear Tire & Rubber Co., Akron 16, Ohio.

Claims: Goodyear has announced a new hydraulic tire changing tool for big earthmoving vehicles. Known as the TO-100, the portable hydraulic tire changer is applicable to all makes and designs of earthmoving rims for either tubeless or conventional tires. It was designed primarily for the new tubeless earthmover tire and rim assemblies recently introduced by Goodyear.

The TO-100 was developed because the company's current tool of that type (TO-1600) was not adaptable to the tubeless earthmover rims.

The TO-100 is suited for standard

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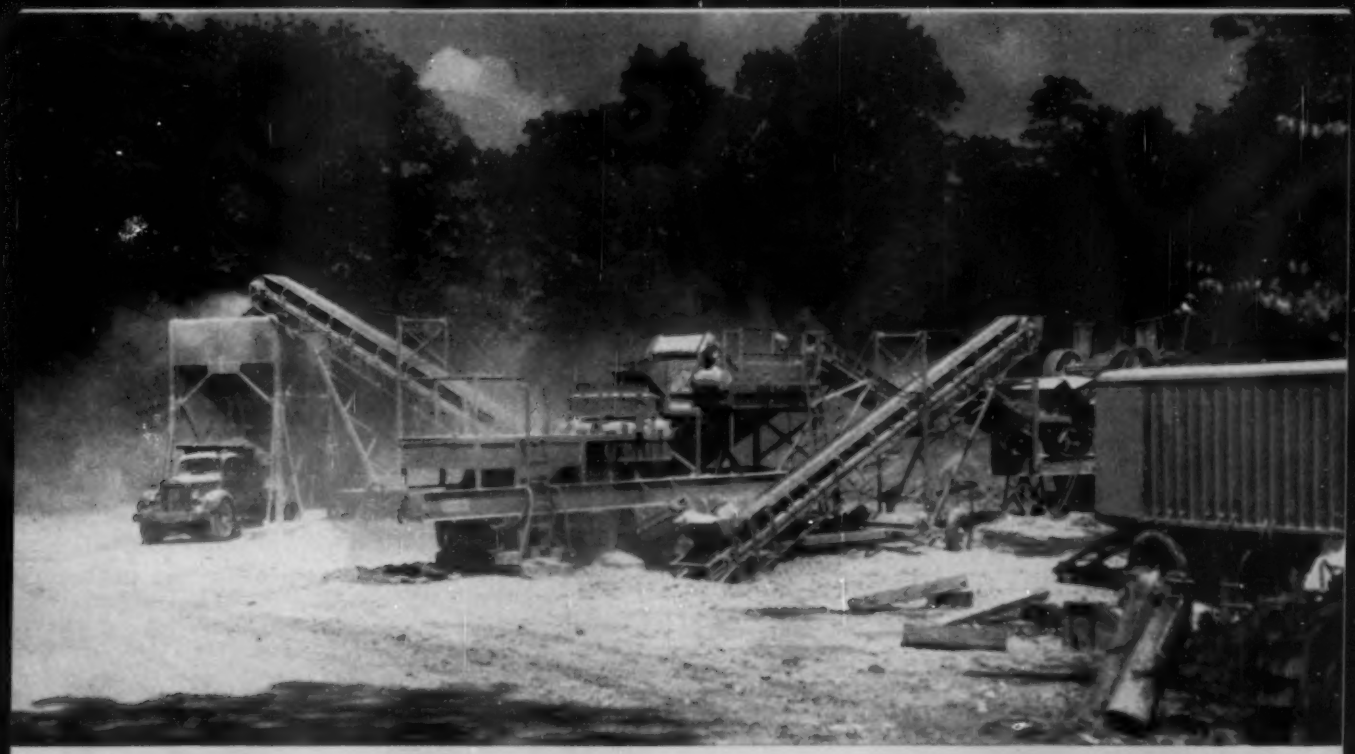


HOW MOBILE CAT* POWER PAYS OFF FOR LAMBERT BROS., INC.

A D397 Mobile Electric Set provides crusher power on a job for Lambert Bros., Inc., near Greenback, Tennessee. The 315 KW D397, Caterpillar's biggest trailer-mounted electric set, is well within highway weight and size restrictions.

When Lambert Bros., Inc., Knoxville, Tennessee, received the contract to furnish 26,000 tons of base material for road construction near Greenback, it set up the operation pictured here. The company provided its own power with this Cat D397 Mobile Electric Set. The 315 KW unit provided the power to run the Cedarapids crusher, working 8 hours a day, 5 days a week. Output averaged about 900 tons a day. Said Lambert's Ben L. Greene: "I like the D397 because it gives us a maximum amount of operation with a minimum amount of maintenance."

For dependable electric power, *when* it's needed and *where* it's needed, you can't beat Caterpillar Electric Sets. They're available in a complete range of sizes, up to 315 KW, for use in emergency or full-time operation. Each is a complete unit, mounted on skids, semi-trailer or trailer. Easy to hook up and easy to operate, they deliver steady voltage. There's one that fits your needs and—as Mr. Greene points out—provides maximum performance with minimum maintenance.

Wherever you move these sets, you always have the plus of prompt service, right on the spot, from your nearby Caterpillar Dealer. For complete information about these versatile power plants, see him soon.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN, HEAVY-DUTY PORTABLE ELECTRIC POWER

New Equipment . . .

Continued from page 64

equipment on construction job service trucks. It can be used on the job for changing or mounting earthmover tires up through the largest sizes.

The new tool consists of three parts —frame, ram and hydraulic pump. The steel jaws of the frame are fastened to the rim of the wheel. Then the ram is placed in the frame with the ram's pointed tip or spade inserted between the tire and the rim flange. Pressure is

applied by means of the pump. This forces the spade downward, prying the tire bead away from the flange and loosening it from the bead seat.

A set of six metal spacers is included with the tool assembly.

'The Gentleman' . . .

Continued from page 32

was afforded from the summit of the hill of clay. Its tub resting firmly on the ground, the three-story-high machine was recasting material from the hill at the rate of about 500 cubic yards an hour.

The Gentleman cast its 15-yd. bucket into the pile of material, executed a half-swing to the left and dumped the load 165 feet away. Without a waste motion, the dragline's operator quickly guided the bucket back to the pile for another big bite.

The Badgett Corp. was awarded the first American earthmoving contract on the Seaway. Badgett's $1,372,800 contract calls for the dry excavation of 3,800,000 yards of earth—most of it glacial till and marine clay—for the western three miles of the Long Sault Canal, together with construction of a section of pool-retaining dikes.

This section of the canal begins on the mainland (Richards Point), crosses the southernmost extremity of Croil Island, then proceeds across Long Sault Island.

The Gentleman's job is to excavate approximately 3 million yards on Long Sault Island. Badgett's only other excavator on the job, a Bucyrus-Erie 5-W walking dragline, is handling the excavation on Richards Point (more than 700,000 yards) and also is scheduled to move about 80,000 yards on Croil Island.

The 450-W and 5-W are veterans of the coal-stripping business; in fact, both made the 2,000-mile trip to Massena from the Kentucky coal fields by barge (*Excavating Engineer, Aug. 1955*). Both machines walked 18 miles from the coal pits to the Pond River. Then was begun a trip up the Pond, Green, Ohio, Mississippi and Illinois River, the Chicago Sanitary and Ship Canal, the Chicago River, four of the Great Lakes and the St. Lawrence River.

The Badgett firm began to work on the canal in late June. By Oct. 1 *The Gentleman* and the 5-W had excavated 1,160,000 cubic yards. Excavation was about 30% complete; the remaining 70% must be moved by next December. About 112,000 yards had been placed in embankments.

Tedder plans to keep his spread working through the winter. He is maintaining three eight-hour shifts six days a week.

All of the excavation on Long Sault Island is spoil. About two-thirds of the material must be recast once. *The Gentleman*, powered by a Cooper-Bessemer JS-8, 8-cylinder, 4-cycle motor, had been averaging 12,000 yards of excavation in 24 hours.

The only other Badgett machines on the island were a TC-12, the twin-powered Euclid crawler tractor, and an Allis-Chalmers HD-20 dozer. The TC-12 was clearing land the day of our visit. The HD-20 is used for leveling.

Maintenance of *The Gentleman* is accomplished during shift changes, a total of about 45 minutes in 24 hours. Don Utley, who operates the 450-W on the day shift, has been with the machine since it was purchased new in 1948. Until it arrived on Long Sault, *The Gentleman* had worked exclusively at coal stripping.

Two diesel fuel storage tanks of 9,000 and 1,000 gallon capacities are maintained on the island. The 450-W has three 15-yd. buckets in reserve.

Back on Richards Point, the 12-year-old 5-W was loading to a fleet of eight Euclid bottom dumps—four each of 25 and 15-yd. capacities.

Dirt Placed in Dike

The dirt was hauled a quarter of a mile across a highway, where it was placed in a dike Badgett was constructing to control the flood area after the pool is raised.

The 5-W carries a 6½-yd. Esco bucket. It is powered by four General Motors 6-71 diesel engines.

Leveling and maintenance on Richards Point were tasks assigned to two Allis-Chalmers HD-20's, a Caterpillar D8 and a Cat Model 12 motor grader.

When the 5-W begins to excavate on Croil Island, three Euclid bottom dumps will be assigned to work under it.

Tedder, a kindly, drawling Kentuckian, became associated with Russell Badgett, Sr., in 1935. When Roger Badgett formed the Badgett Mine Stripping Corp. in 1944, Tedder joined him.

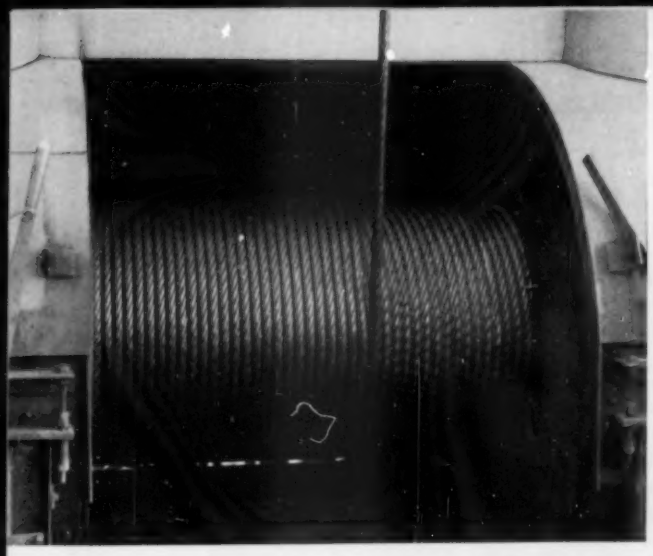
Other Badgett men on the Seaway job include: Floyd McMeans, hauling superintendent; Bert Newsom, equipment superintendent; and Bill Waterman, second shift hauling superintendent.

The Badgett firm, incidentally, constructed a 12.3-mile section of the Ohio Turnpike. Using rubber-tired scrapers, Badgett in two different months moved 964,000 and 940,000 yards of dirt.

"But there's no scraper dirt up here," Tedder said.

That's why *The Gentleman* was called into action.

Polio isn't licked yet!
Join the MARCH OF DIMES
January 3 to 31



OVERCOMING ABRASION—Wire rope takes a beating on some jobs by abrasion. It is squeezed in multiple layers under tremendous pressure on rotary drilling drums in the Texas oil fields. In the Northwest it drags under heavy logs.

In this Arizona mine it is scraped over rocks to operate a slusher. Everywhere it is rubbed severely on winches that do not wind smooth. Under such conditions Red-Strand 6 x 19 Seale wire rope will last longer and save you money.

What can you do better with 6x19 Seale Red-Strand?

6 x 19 Seale has the same strength and weight as the more frequently used 6 x 19 Filler Wire, but the arrangement and size of the wires is different. You can see in the diagrams that the outer wires are fewer in number and larger in size. They provide *high resistance to abrasion* and greater wearing quality with somewhat less flexibility.

It's the perfect rope for certain jobs. Would it solve a problem for you? Be less trouble? Save more money? A Leschen man is near you. Perhaps he can help.

Send for the 64-page Leschen Wire Rope Handbook. It describes Seale and all other Red-Strand wire rope constructions.

6 x 19 Seale

6 x 19 Filler Wire

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.
St. Louis 12, Missouri

LESCHEN HERCULES Red-Strand® WIRE ROPE HKP

NOT in the Contract

The wealthy contractor's wife confided to her maid, "I think my husband is having an affair with his stenographer."

The maid was appalled. "I don't believe it. You're only saying that to get me jealous."

A contractor's client had to leave on a long trip before the end of a lawsuit he had brought against the contractor. He left instructions with his lawyer that the verdict should be sent to him by wire.

He later received this telegram: "Right has triumphed."

He wired back: "Appeal immediately."

An engineer said to a new stenographer in his office, "I hope you understand the importance of punctuation."

"Oh, my, yes," she answered. "I always get to work on time."

A man we know tells of the night his wife became suddenly ill. The quickest available doctor was a new man who, after examining the lady, stepped outside the sick room and requested that our friend get him a screwdriver. Receiving the tool, he quickly returned to the patient, but reappeared in a few minutes asking for a pair of pliers. Once more he disappeared into the ailing woman's room, only to return demanding a hammer.

Finally, after another trip, this time for a chisel and a mallet, our friend could no longer restrain himself.

"Doctor!" he cried, "What is it? What's wrong with her?"

"Don't know yet," replied the physician. "I can't get my instrument bag open."

The proprietor of the little country store was extolling the virtues of a bottle of spot remover to a doubtful lady customer.

"Are you sure it works?" she asked.

"Had nothing but satisfied users of it, ma'am," replied the merchant. "The Widow Brown was mighty pleased with the results she got by mixing it with a little whiskey."

"What did she remove with that?" inquired the lady.

"Mr. Brown," replied the storekeeper with a sly chuckle.

"What is the feminine of bachelor?" During an examination the coed pondered the question. Inspiration flashed. She answered, "Lady-in-waiting."

Seeking a divorce a woman told the judge, "I want my freedom and I also want ammonia."

"Ammonia? You mean alimony. Spirits of ammonia is used to wake people up."

"I'll need lots of that, judge, to get him to work long enough to be able to pay alimony."

In a sparsely populated section of Texas, the wife of the owner of a huge ranch received a phone call from the next-door neighbor inviting her family to dinner that evening.

"I'm sorry, but we can't possibly make it," she told the caller. "Our plane is being repaired."

A construction worker, drawn for jury service, asked the judge to excuse him. "We are very busy," said he, "and I ought to be there."

"So you are one of those men who think the construction business couldn't get along without you," said the judge.

"No, your honor," he replied. "I know it could get along without me, but I don't want it to find out."

A salesman's wife who had just seen her husband off at the train, returned home very disturbed. It seemed that a gorgeous blonde had boarded the same Pullman car he was to get on.

"Surely you're not worried about Daddy?" asked her teen-age daughter. "I'll bet he never even noticed her."

"No?" retorted the distressed lady. "Then why did he give me his suitcase and kiss the porter good-bye?"

Miss: "That fresh taxicab driver offered me a quarter for a kiss."

Friend: "What are you looking in your pocketbook for?"

Miss: "Gee! For a minute I thought I'd lost the quarter."

Lady: "Can you give me a room and bath?"

Clerk: "I can give you a room, madam, but you will have to take your own bath."

"That means fight where I come from!"

"Well, why don't you fight then?"

" 'Cause I ain't where I come from."

"To you, it may be a lot of dirt, but to me it's a challenge."

Down time is no joke.

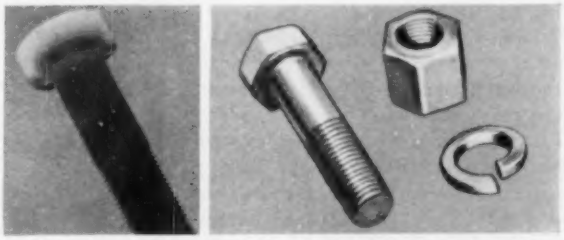
But it happens at times when track hardware gives out.

If you replace with original Caterpillar hardware, here's what you're sure of: bolts, nuts, capscrews and lock washers made from prechecked fine-grade steels, carefully hardened and tested, finished to the strictest specifications in the industry. You're sure of longer wear life, no matter how tough your jobs come. You're sure of *less* down time in the future.

If you replace with substitute hardware—can you be sure of anything?

Better get Caterpillar parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



On the surface, CAT hardware looks like ordinary kind. But etched cross section of newly designed track bolt (left) shows depth of special "Hi-Electro" hardening penetration in bolt head.*

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

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UNUSED Army Trucks
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Tandem axle trucks with front wheel drive, 10 forward speeds, overdrive, brand-new mud and snow tires. Carry maximum loads, give extra power you need in "rough going" . . . at LESS, often half the COST of conventional new trucks.

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MEMPHIS EQUIPMENT Company
CONSTRUCTION AND AUTOMOTIVE EQUIPMENT AND PARTS
766 SO. THIRD ST. MEMPHIS, TENNESSEE

Dutcher . . .

Continued from page 41

for yard work. Four lighting plants serve the area—two Cat 3400 diesel-electric units, a General Motors diesel electric and a Universal gas.

Equipment maintenance is done in a 40 x 60 ft. shop. Fueling and lubrication are handled in the field by one big and two small service trucks.

Dutcher, who is maintaining two 10-hour shifts six days a week, plans to operate at capacity through the winter.

The Dutcher Corp. came to the Seaway job from Plattsburgh, N. Y., where it had a 3,800,000-yd. earth moving contract on a Strategic Air Command (SAC) jet base.

Dutcher officials on the Seaway job, in addition to Dutcher and Norris, include: Gail Wolf, equipment superintendent; Gertha Shipman, early shift superintendent; Bruce Aunkst, late shift superintendent.

Excavation for the Robinson Bay Lock of Long Sault Canal was temporarily discontinued at the time of our visit. The Robinson Bay Lock is three miles west of the Grasse River Lock.

A new contractor, the Tecon Corp. of Dallas, Tex., was awarded a $1,063,905 contract and began operations Oct. 28.

The original contract, awarded for $990,000 last March, called for excavation of 2,575,000 yards, practically all glacial till, and construction of two pool-retaining dikes requiring about 1 million yards of material.

The original contractors began actual work in May. When they forfeited their contract on Oct. 1, they had completed about 50% of the excavation and 85% of the dike work.

Tecon is scheduled to complete the excavation in February.

Galop Job . . .

Continued from page 57

would allow the 450-W to lower its mammoth shoes and walk across the dike 500 feet to the island.

The dike, which already was half way across the river, was being leveled by one of the two Cat D8's assigned to the Galop job.

Waiting for the 450-W on Lalone would be 775,000 yards of dirt to excavate on the north end of the island.

Early excavation at Galop had amounted to 100,000 yards by October. Also on the job were a Bucyrus-Erie 120-B electric shovel, two Cat D8's, an International TD-24 crawler and a rented Caterpillar D6. Later, 12 Euclid end dumps were to be assigned to the location. A Northwest 80-D crane was being used in the yard.

Some of the excavated material, which is similar to that at Red Mills Point, will be spoiled downstream. As much as possible will be spoiled on the mainland. Much will be used as fill on the islands. The fill on the islands will be contained by rock with a top width of 30 feet.

Four cofferdams will be constructed at the Galop job: 900 feet from the mainland to Round Island (west of Lalone Island), 450 feet from Round to Lalone Island, 750 feet from Lalone to Lotus Island, and 1,000 feet from Lotus to the mainland.

The dried-out channel will be excavated by the 120-B's. The larger draglines will handle the underwater excavation. Stang 25,000-gpm diesel and electric pumps will be used for dewatering.

M-K is manufacturing its own rock for roads on the job with material from a quarry of dolomite rock it developed on the mainland opposite Lalone and Lotus islands. By October, 75,000 yards of rock had been shot; M-K officia's figured that another 50,000 or 75,000 yards would be needed.

An Ingersoll-Rand Drillmaster was drilling 6-in. holes; three Gardner-Denver wagon drills were putting in 2⅛ to 2⅝-in. holes. Holes were being drilled on 20-ft. centers. Atlas powder, ¾ pound per yard, was being used for blasting.

In a home-made crushing plant, a Telesmith crusher reduces the stone to a 1½-in. size.

V. A. Roberts is a consultant to Binder on the project. Roy King is project engineer and D. O. Davis is office manager.

Hendrix

Lightweight

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IN USE THROUGHOUT THE WORLD...

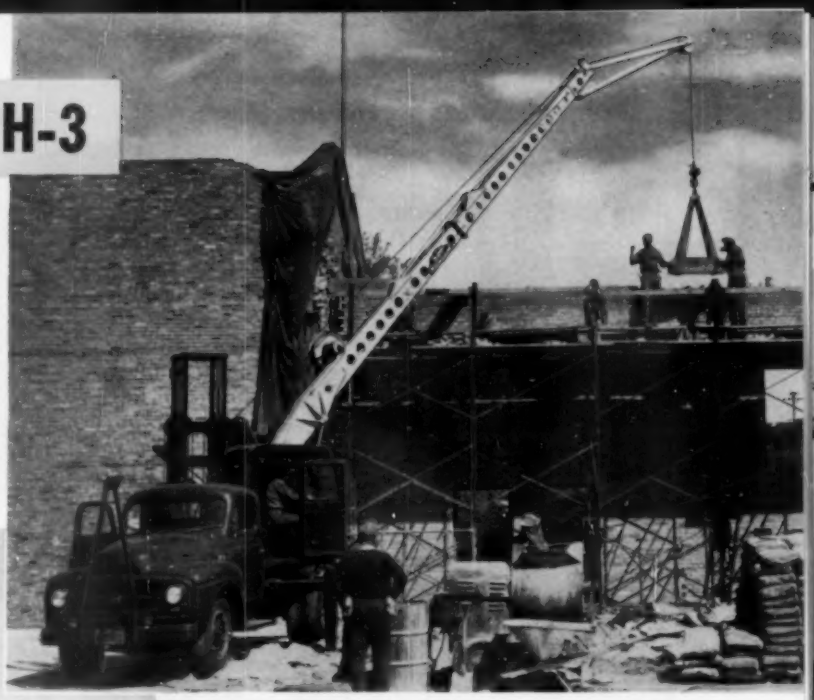
A TYPE FOR
EVERY DIGGING PURPOSE

¼ to 40 Cubic Yards

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

Versatile speedster — Here an H-3 Hydrocrane erects concrete planking. Smooth, exact control reduces possibility of damage to planking, permits operator to set a steady, big output pace.

H-3



Pictured is the new H-5 Hydrocrane pouring concrete for a laundry building under construction. Nine-ton capacity as a crane, ½-yd. as an excavator, yet it mounts on a *conventional truck, new or used, without sacrificing* work capacity. You can choose the truck that fits your needs best.

H-5

Now!

BUCYRUS-ERIE HYDROCRANES IN TWO FAST-TRAVELING, SMOOTH-WORKING MODELS

Choose the Hydrocrane that's best for your jobs. Bucyrus-Erie now offers this multi-job, all-hydraulic truck-crane in *two* popular sizes. First there's the 4-ton, ⅜-yd. H-3 — a long-standing favorite among users on a wide variety of erecting and digging jobs . . . available with 18- to 26-ft. standard telescoping boom or 30- to 38-ft. erector's boom.

And now Bucyrus-Erie brings you the new higher-reaching, bigger-digging, 9-ton, ½-yd. H-5 Hydrocrane. Standard boom telescopes hydraulically from 24 to 36 feet, high-lift boom from 38 to 50 feet — and can be retracted to 25 feet for travel. Both models bring you all the operating advantages of full hydraulic control of all work functions, 45- to 50-mph top travel speed, exceptional ability for working and maneuvering in close quarters.

For some users the Model H-3 is still the best buy; for others the greater capacity and long boom reach of the H-5 open the way to bigger savings on more jobs. Your Bucyrus-Erie distributor can help you choose the right one for your specific needs. See him now for full details.

109H55C

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South Milwaukee Wisconsin

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TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Lima 2400 dragline equipped with 110' boom, two 7-yard Hendrix HS buckets, one 6-yard ESCO bucket, Kohler light plant; machine powered with Caterpillar D-397 diesel engine; 63" wide treads; long caterpillar frames; machine shipped September 1950; completely overhauled June 1955; engine completely overhauled April 1955; Approximately $5000 in spare parts available; Price, as is where is, $115,000. Box 3677

Bucyrus-Erie 120-B shovel serial no. 37106 with two 5 yard dippers and spare long handle with 4 yard dipper; also includes about 2,000 feet power cable and a considerable quantity repair parts; good working condition; location State of Washington; price: $87,500. L. E. Dixon Company, 409 South California, San Gabriel, California.

Bucyrus-Erie 375-B dragline with 150 foot boom and 10 cubic yard bucket; shipped 1930; location Illinois. Address Purchasing Agent, Truax-Traer Coal Company, 111 North Wabash Avenue, Chicago 2, Ill.

Marion 360-M dragline with 150 foot boom and 10 cubic yard bucket; shipped 1928; location Illinois. Address Purchasing Agent, Truax-Traer Coal Company, 111 North Wabash Avenue, Chicago 2, Illinois.

Bucyrus-Erie 54-B, equipped as 3 yd. diesel dragline, 80' boom, long wide crawlers, excellent condition, serial no. 86672, new 1951. Write: L. G. Everist, Inc., Sioux Falls, South Dakota.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie 15-B, ½ yard positive crowd shovel, 15' 6" boom, 12' 6" handle, fully enclosed steel cab, independent power boom hoist, 20" cats 10' 7" long 8' 3½" wide, International UD-9 diesel engine; this machine is in excellent shape and is a very exceptional buy.

Bucyrus-Erie 15-B, ½ yard dragshovel, 16' boom, 7' dipper, with 24" bucket, Buda gas engine with electric starter; this machine is in good shape. Phone: Lexington 9-4313 or wire collect to: S. M. Christhilf and Son, Inc.; 134 West Mount Royal Ave., Baltimore 1, Maryland.

P & H model 150, ½-yd. crane with Ford engine, 35' boom, one ⅜-yd. dragline bucket.

15-B Bucyrus-Erie dragline crane with standard boom and 5' extension, Buda engine and ½-yd. Bucyrus-Erie dragline bucket.

Unit 1020 dragline, 3 years old; has 3-71 GM engine, 35' boom, 24" shoes.

One TS-300 Allis-Chalmers motor scraper, serial #580, with Buda engine. E. F. Craven Company, Greensboro, North Carolina.

BUCYRUS-ERIE 54B
2½ yd. SHOVEL FRONT
This attachment, only, in "Like New" condition. Less than 30 days' usage. New machine guarantee.
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BUCYRUS-ERIE 38B
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Shovel front in operating condition.
Price
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BAY CITY MODEL 150
TRUCKCRANE
½ cu. yd. with 35' boom.
Truck powered by a Hercules WXLC3 gas engine and crane with a Hercules JXB gas engine
A good buy for
$10,000.00

Wire or phone CYpress 2-4800

H. O. PENN MACHINERY CO., INC.
140th Street & East River
New York 54, N. Y.

Thew-Lorain model 75A, 1¼ cu. yd. combination crane and dragline with shovel attachment; powered by Caterpillar D13000 Diesel engine; excellent condition. D. D. KENNEDY, INC., Madison & Mannheim Rd. (U.S. 45), P. O. Box 177, Bellwood, Ill.; Phone: Austin 7-4300 or Linden 4-5600.

Osgood heavy duty ½ cubic yard backhoe, 3 years old, s/n 6206, equipped with Buda Diesel model 6DT-317, 11'-6" crawlers, 21" pads; Price: $5,000; 30' crane boom with new ½ cubic yard drag bucket available. Riemer Bros., Inc., 9800 W. Waveland Ave., Schiller Park, Ill.

MISCELLANEOUS EQUIPMENT

CUMMINS DIESEL ENGINE BLOCKS New; priced for quick sale at less than half price. Re. E. Fox, P. O. Box 151, Greensburg, Pa.; Phone: Greensburg 34.

Caterpillar D-1300; serial #5610, engine complete —radiator to clutch—electric starting; new 1951—never used. American Fire Clay Co., Canfield, Ohio.

Locomotives, diesel, gas, 5 to 100 tons. Bucyrus-Erie 54B, 100B, 120B & 170B shovels. P & H 2½-5 yd. shovels; Marion 93M, 111M, 75 & 30-ton derricks. Hammerhead crane. Cranes, dragls., diesel, elec., 1½-18 yd. Diesel-elec. generators, 400 to 3500 KW. Rotary kilns, rotary direct heat dryers. Monighan Walker dragls., 9, 7, 5W, 200W. Placer dredges, 4½', 6', 12', 16'.

H. Y. SMITH COMPANY
828 N. Broadway Milwaukee 2, Wis.

New 18" dredging pump, rectangular cross section casing, high alloy steel liners, high alloy cast steel 4 vane runner; spare liners. Box 3587

One—Ingersoll-Rand, model QM-2 Quarrymaster equipped for 6" hole with 40' steel changes; two —500 cfm Diesel driven aircooled compressors with regulators; purchased new 1952; overhauled and rebuilt Feb. 1954; not used since; Located Eastern Pennsylvania. Box 3679

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PROMINENT EXCAVATOR MANUFACTURER HAS OPENING FOR CAPABLE MAN EXPERIENCED IN SHOVEL AND DRAGLINE OPERATION AND MAINTENANCE. MUST SPEAK SPANISH FLUENTLY. MUST BE AN AMERICAN CITIZEN AND WILLING TO TRAVEL. SEND COMPLETE INFORMATION ON BACKGROUND AND REFERENCES WITH RECENT PHOTOGRAPH TO EXCAVATING ENGINEER. BOX 3681

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New Trade Literature

Subject: **Wire Rope Slings**
Content: Colorado Fuel & Iron Duragrip wire rope slings are featured in a bulletin prepared by the company's Wickwire Spencer Steel Division. The bulletin illustrates the various assemblies for which the slings can be used and gives a complete listing of dimensions and rated capacities.
Where to get: The Colorado Fuel & Iron Corp., 575 Madison Avenue, New York, N. Y.

Subject: **Allis-Chalmers Products**
Content: Allis-Chalmers has issued four catalogs describing new products. An eight-page catalog, MS-455, describes the 60-hp W-226 power unit. Included in the catalog are specifications, cut-away views of the power package and many of its components; photographs of the fan to flywheel unit; the open style unit and the standard unit available to meet the specific installation requirement of the user; and a listing of the special and extra equipment. The features of the HD-6 diesel-powered crawler tractor are described in catalog MS-461. The HD-6 is a unit of 45 drawbar hp. The full line of matched equipment and accessories available for the HD-6 is listed. Catalog MS-457 describes the HD-21 diesel-powered crawler tractor. Matched equipment and the complete line of accessories designed for the HD-21, which has 204 net engine hp, are described in the catalog. The Forty-Five motor grader is described in catalog MS-446. Specifications are outlined along with standard and optional equipment.
Where to get: Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Subject: **Caterpillar Booklets**
Content: Caterpillar has issued two more bulletins. A *New Caterpillar Scraper, the No. 463*, is a pamphlet describing one of the Caterpillar scrapers with the new low bowl design. The No. 463 is a four-wheel crawler-drawn scraper. In addition to the low bowl design, the No. 463 has high apron lift and high ground clearance. Ask for Form No. 31700. *Just as good . . . ?* is a booklet which compares parts available from the machine manufacturer to those offered by substitute parts manufacturers. Ask for Form DE591.
Where to get: Caterpillar Tractor Co., Peoria, Ill.

Subject: **Sauerman Blocks, Fittings**
Content: Sauerman has issued two new bulletins. Features of Durolite blocks in sizes from 6 to 42 inches are shown in Bulletin No. 163. A new rigger's block with an extra wide sheave groove which permits use of larger cable than the standard block of the same diameter is also described. Bulletin No. 164, *Wire Rope Fittings*, contains tables, drawings and ordering information for open and double wedge sockets in rope sizes from ⅜ to 2 inches.
Where to get: Sauerman Bros., Inc., Dept. E-23, 620 S. 28th Ave., Bellwood, Ill.

Subject: **Soil Stabilization**
Content: *Soil and Soil-aggregate Stabilization*, Bulletin No. 108 of the Highway Research Board, is a collection of 14 papers by outstanding engineers and scientists from three continents. The first papers describe

"Mt. Pleasant Hospital . . . and step on it!"

soil as a natural body having distinct characteristics inherited from the materials from which it is derived and the environment which produced it. These papers discuss the fundamental nature of soil as it has been drawn from the several different branches of science. The main body of papers describes our present knowledge of soil stabilization, whether by control of grain-size distribution and characteristics of the soil itself or by the addition of organic or inorganic compounds to produce artificially or to maintain a stable condition. The price is $3.

Where to get: Highway Research Board of the National Academy of Sciences—National Research Council, 2101 Constitution, Washington, D. C.

Subject: **Le Roi Industrial Engines**

Content: An eight-page bulletin describes Le Roi's industrial H540 and H844 V-8 engines. The bulletin contains charts, drawings and diagrams relating to the engines' design and performance. The engines operate on gasoline, natural gas or LP gas. The H540 is rated at 190 hp; the H844 at 285 hp. Both engines are described as of modern, short-stroke design. The bulletin shows engine applications and lists specifications and available optional equipment.

Where to get: Sales Promotion Dept., Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wis.

Subject: **Belt Conveyor Idlers**

Content: Information on the selection, application and mounting of the Marsh (MARCO) line of belt conveyor idlers is available in a new catalog.

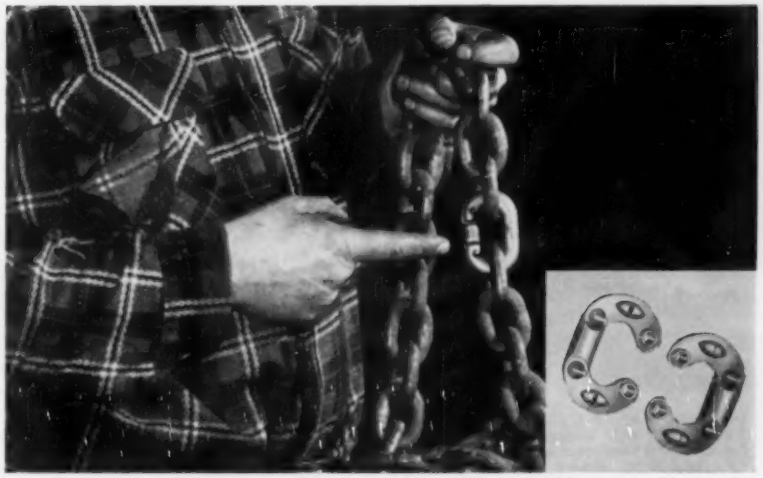
Where to get: E. F. Marsh Engineering Co., St. Louis, Mo.

New Movies . . .

Subject: **Wire Rope**

Content: *Lifeline*, a 16mm sound film, is a story of wire and wire rope manufacture. The film shows the use of wire rope in various industries. It takes its viewers on a trip through wire and rope mills. The scene for the story is the mills of Macwhyte Co. The film runs 22 minutes and is available to engineering societies, clubs and associations on a loan basis.

Where to get: Macwhyte Co., Publications Manager, Kenosha, Wis.



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Actually stronger than proof-coil chain, famous Laughlin genuine "Missing Links" give an added element of safety on the job to men and equipment. Safety-conscious contractors say, "For safety's sake, we always specify Laughlin, the world's strongest split connecting link." Drop-forged from special forging steel and heat-treated, Laughlin genuine "Missing Links" are matched under pressure for a perfect fit. They are available in a complete range of sizes ⅜" to 1⅜" at distributors everywhere.

SAFETY RECORD FOR CROSBY CLIPS, BLOCKS

Working efficiently means working safely. Two products designed for safety as well as efficiency—genuine Crosby Clips and Load-Rated Crosby Blocks—are helping set safety records

on projects across the country. Long-recognized as industry's safest clips, Crosby Clips, with the famous Red-U-Bolt, are specified by more construction firms than any other drop-forged wire rope fasteners.

To safeguard men and equipment, Load-Rated Crosby Blocks have the safe working capacity of each block embossed right on the sideplates. To help keep your jobs safer, insist on genuine Crosby Clips and Crosby Blocks . . . products of the Crosby Products Division, American Hoist & Derrick Co., St. Paul 1, Minnesota.

LAUGHLIN SHACKLES 36% STRONGER

Shackle strength depends for the most part on the kind of steel used. Recent tests show that famous Laughlin drop-forged shackles have an ultimate tensile strength of approximately 75,000 pounds per square inch—36 percent more than ordinary shackles.

RIGGERS WANT SAFETY HOOK

Jobs where one miscue can endanger men and equipment require the safest possible equipment. To prevent loads jarring from the hook—a major cause of accidents—safety leaders specify Laughlin Safety Hooks. Drop-forged Laughlin Safety Hooks are equipped with a powerful, easy-to-operate snap spring latch that guarantees loads cannot slip or jar from the hook and prevents overloading the hook with too many lines. Here's another safe, efficient Laughlin product from the world's most complete line of fittings in all sizes for wire rope and chain. For complete catalog, write: Thomas Laughlin Division, American Hoist & Derrick Co., St. Paul 1, Minnesota, or Portland, Maine.

STANDS UP TO SEVERE USE

and even abuse

One word describes a Hayward — *ruggedness.* Yes, it's as tough, strong, sturdy as a bucket can be — and even more so. Extreme simplicity, little if any upkeep, high operating efficiency! Details on request. Write! THE HAYWARD COMPANY, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLER

famous for performance since 1888

Notes from the Manufacturers

Caterpillar Tractor Co., Inc., Peoria, Ill., has announced that the first overseas-produced earthmoving machine to bear the Caterpillar label has come off the assembly lines at Braybrook, Victoria, Australia. The first machine completed by Caterpillar of Australia Pty. Ltd., a recently established subsidiary of Caterpillar, was a No. 12 motor grader. Other Caterpillar products now in production in Australia are: No. 212 motor grader, Nos. 46, 44, 41 hydraulic controls, Nos. 30, 29, 27, 25, 24 cable controls, Nos. 8A, 8S, 7A, 7S, 6A, 6S cable bulldozers, Nos. 2A, 2S, 4A, 4S, 6A, 6S hydraulic bulldozers and No. 2 and No. 4 tool bar. The equipment will be assembled at Steelweld Pty. Ltd., Braybrook, until the completion of a new Caterpillar plant at Melbourne. Caterpillar has announced the appointment of Frank A. Grooss as assistant to Vice President G. E. Burks, who has administrative responsibility for the engineering and research departments. Grooss, a specialist in the development of wheel tractors, motor graders and scrapers, formerly was assistant chief engineer at the company's new plant at Decatur, Ill.

Clark Equipment Co., Benton Harbor, Mich., will expand its new Construction Machinery Div. plant in Benton Harbor by 50% with the construction of a 125,000 sq. ft. manufacturing addition. Announcement of the 240 x 520 ft. addition was concurrent with the opening of a new headquarters administrative building which climaxed a 100,000 sq. ft. expansion program started last year. The original plant, opened in 1954, had 150,000 square feet of production area. The additional floor area will be used for assembling all models of Michigan tractor shovels.

Colorado Fuel and Iron Corp., New York, N. Y., has announced election of Hubert C. Smith as vice president in charge of operations of its Eastern Div. He will make his headquarters at Claymont, Del.

Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich., has appointed Robert E. Hunter as general sales manager. Hunter had been director of sales of General Motors Diesel Ltd. of Canada.

Electric Steel Foundry Co., Portland, Ore., has appointed Gordon Ley as district representative serving the Colorado area.

Euclid Div., General Motors Corp., Cleveland, Ohio, has appointed the Ray C. Call Co., South Charleston, W. Va., as an authorized dealer for the complete Euclid line of earth moving equipment. The territory will cover all of West Virginia except for the counties of Brooke, Hancock, Marshall, Ohio, Morgan, Berkeley and Jefferson and will include Garrett and Allegany counties in Maryland.

The Garrett Corp., Los Angeles, Calif., has announced the election of J. C. Garrett, president and founder of the corporation as chairman of the board. W. C. Whitehead, formerly executive vice president of the firm, was elected president. Company stockholders voted to increase the authorized number of common shares of the corporation from 1 million to 1,500,000.

Hercules Powder Co., Wilmington, Del., has appointed Dr. Robert W. Cairns as director of research. He had been assistant director of the research department since 1945. Dr. Cairns succeeds Dr. Emil Ott, who resigned to join Food Machinery and Chemical Corp.

Manitowoc Engineering Corp., Manitowoc, Wis., has appointed the following new dealers to handle sales of its power crane and shovel line: J. D. Coggins Co., Albuquerque, N. M., serving the northern counties of New Mexico; Caprock Machinery Co., Amarillo, Tex., northern portions of Texas; Reicco, C. A., Caracas, Venezuela, throughout Venezuela. Manitowoc has appointed the Walter S. Wolff Co., Stockholm, Sweden, as a distributor in the Scandinavian countries.

H. K. Porter Co., Inc., Pittsburgh, Pa., has acquired two concerns. They are Henry Disston & Sons., Inc., Philadelphia, Pa., and Carlson & Sullivan, Inc., Monrovia, Calif. The latter concern will operate as part of Porter's new Henry Disston Div.

Timken Roller Bearing Co., Canton, Ohio, has announced the appointment of Daniel J. Girardi as metallurgical engineer in charge of research and process control. He will direct metallurgical research and mill metallurgical work for all divisions of the company.

There's only one

GYRO-FLO

Ingersoll-Rand's Portable Rotary Compressor

INTRODUCED IN 1950

In 1950 the Gyro-Flo was absolutely new—a bold, forward, original idea in portable compressors. There was no other portable compressor like it.

Now, years of successful performance of thousands of units in all four sizes has established GYRO-FLO as the standard in portable compressors. This is affirmed by the ever-growing trend to rotary design.

Here there is no substitute for experience. Maintenance costs cannot be measured by one year's operation—or even two or three years'. Each size must pass the test of time on the job. That's what GYRO-FLO has been doing since 1950. During this time all new, necessary features have been added so that GYRO-FLO is the best established rotary portable compressor now available.

When you purchase GYRO-FLO air power, you get today's most economical portable compressor. There is only one GYRO-FLO – and Ingersoll-Rand has made it since 1950.

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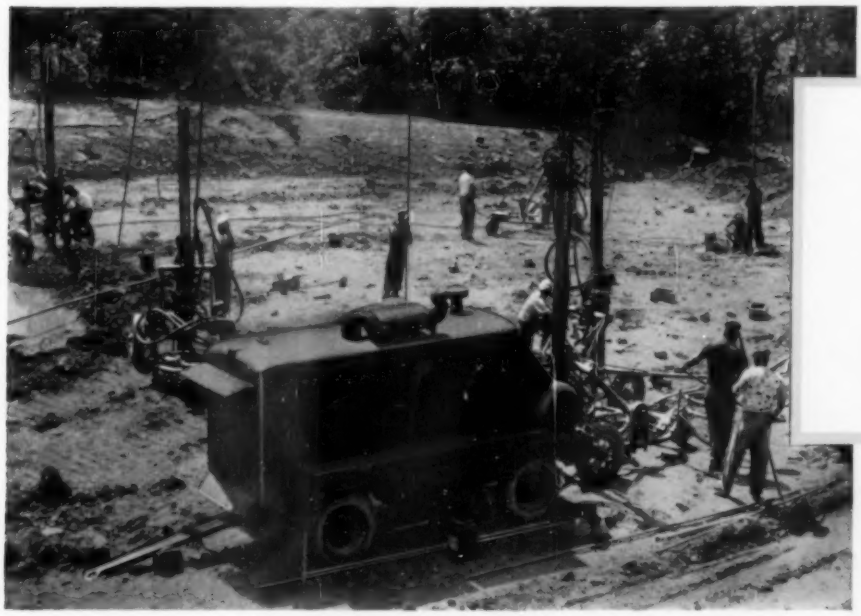
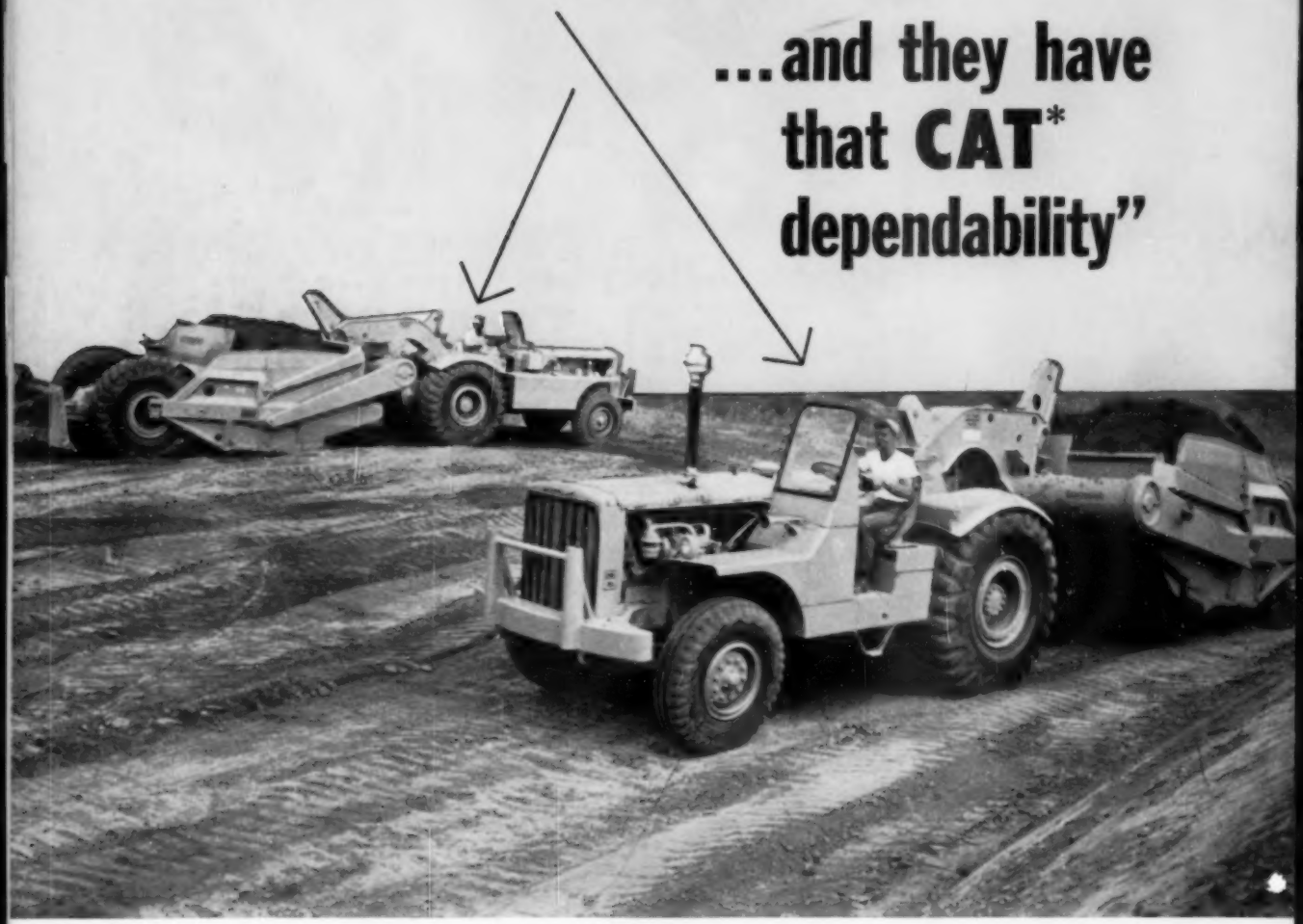


AVAILABLE IN FOUR SIZES

125 *cfm*
210 *cfm*
315 *cfm*
600 *cfm*

2-294

"They move plenty of dirt ...and they have that CAT* dependability"



A county road south of Bloomington, Kansas, had to be straightened. Fill for the job—some 70,000 yards of clay and loam—were to come from changing Kill Creek's channel . . . a big assignment that called for fast-stepping heavy-duty machines. G. W. Christolear, of Heide & Christolear Construction Co., Smith Center, Kansas, says, "We looked the earthmoving equipment field over, watched all makes of rubber-tired machines, talked to the owners, and settled on Caterpillar DW15s. The fact that they move plenty of dirt and have that Cat dependability convinced us."

The DW15s on this job haul heaped loads in their No. 15 Scrapers, making an 800-yard round trip in just over four minutes. They go ten hours a day on only 35 gallons of fuel.

These 186 HP four-wheeled workhorses are designed and built for tough, fast, economical work. They offer ten forward speeds to 24 m.p.h.—to 31.3 m.p.h. with optional gears. They perform especially well in narrow, confined areas. And they work smoothly with a complete line of matched units—with scrapers, and with bottom dump and side dump wagons.

But only a real demonstration can show you the DW15's advantages. Call your Caterpillar Dealer today. And remember, he's always handy with competent service and factory parts—parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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